ZOE

A BIOLOGICAL JOURNAL.

PUBLISHED QUARTERLY.

VOL. IV. JULY, 1893. No. 2.

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SAN FRANCISCO:

ZOE PUBLISHING COMPANY,

P. O. BOX 2114.

Entered at the Post Office at San Francisco as Second-Class matter.

Yearly Subscription, $2.00.
Single Copy, 75 cts.

Issued August 10, 1893.

ZOE

A BIOLOGICAL JOURNAL.

Published Quarterly by the

ZOE PUBLISHING COMPANY, San Francisco, Cal.

Subscriptions, $2.00 Per Year; Single Numbers, 75 Cents.

Foreign Countries in the Postal Union, 9 Shillings.

This price is invariable, no discount being made to dealers or agents.

☞Please remit by Postal Note or Money Order. Checks on local Banks not received.☜

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Volume i, pps. vi, 389, plate i-xii, vol. ii, pp. vi, 411, 6 plates, and vol. iii, pp. vi, 383, 7 plates, price, $2.00 each; may be obtained from the publishers.

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A BIOLOGICAL JOURNAL

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LIST OF PLANTS COLLECTED IN SOUTHEASTERN UTAH, WITH NOTES AND DESCRIPTIONS OF NEW SPECIES.

BY ALICE EASTWOOD.

1. DELPHINIUM SCAPOSUM Greene. Widely distributed through the region. Collected near Moab, along McElmo Creek, and at Mancos.

2. BERBERIS FREMONTI Torr. Collected near Moab, across the Grand River, in fruit. It grows along the rocky sides of the cañon. The plants were covered with a scale insect. The fruit is a berry containing no juice. The loose coat encloses about ten or twelve seeds. It was also collected in flower between Hatch's Wash and Monticello; but the amount of fruit is much less than the quantity of flowers. In the latter locality it grew along cliffs near the bed of streams that in May were dry.

3. ARGEMONE PLATYCERAS Link & Otto. A peculiar, rather sickly-looking plant was collected at Moab, with narrowly oblong leaves, very spiny, but not in the least hispid, flowers not an inch in diameter, fruit also small, but not ripe, and so not in a fit condition to describe.

4. DRABA CAROLINIANA Walt. var. MICRANTHA Gray. Found under sagebrush and piñons from Grand Junction to Mancos.

5. ARABIS PULCHRA M. E. Jones. This was noted in several places along the route. It was collected in a cañon between Hatch's Wash and Monticello.

6. LEPIDIUM MONTANUM Nutt. This grew in abundance in Hatch's Wash under the sagebrush and at other places along the road. I believe, as Professor Jones, that there is no real dis-

tinction between this and *L. alyssoides;* for I find myself always in doubt concerning certain plants.

7. LESQUERELLA MONTANA Watson. This is not uncommon through southeastern Utah, and is usually found under the cedars and piñons.

8. ERYSIMUM ASPERUM DC. A few plants were noticed in a rocky cañon. They had shorter pods than any before seen.

9. SISYMBRIUM LINIFOLIUM Nutt. This was seen here and there through the region, on the mesas.

10. STREPTANTHUS CORDATUS Nutt. This was generally found on cedar-covered mesas.

11. STREPTANTHUS LONGIROSTRIS Watson. Reported in the general notes of a trip through southeastern Utah, Zoe iii, 4, as *Arabis longirostris* Watson. Thompson's Springs. It is common on the adobe desert and also on the mesas.

12. THELYPODIUM AMBIGUUM Watson. Thompson's Springs.

13 THELYPODIUM AUREUM Eastwood. Along McElmo Creek. Most common at Mancos, where the type was collected.

14. BISCUTELLA WISLIZENI Benth. & Hook. On a sandy flat in Court House Wash, and along McElmo Creek in a similar situation.

15. CLEOMELLA PLOCASPERMA Watson. The stamens surpass the petals, the pedicels are horizontal and about as long as the deflexed stipe, the seeds are not tessellated, but may not be sufficiently ripe. In all other characteristics it resembles the above-named species. It is not *C. oöcarpa* as that species is represented in the Herbarium of the California Academy of Sciences. Collected between Thompson's Springs and Moab.

16. POLYGALA ACANTHOCLADA Gray. This spiny plant was collected in Montezuma Cañon on a rocky hill.

17. MALVASTRUM LEPTOPHYLLUM Gray. Collected in Court House Wash and along McElmo Creek.

18. SPHÆRALCEA MUNROANA Spach. Collected after leaving Moab, a form with light pink flowers. The red-flowered form is common through the whole region.

19. LINUM RIGIDUM Pursh. This was quite abundant in the sandy bottom near the Grand River. It has taller and more diffuse stems than the Grand Junction plant, and the flowers are larger and lighter in color.

20. GLOSSOPETALON SPINESCENS Gray. This is not plentiful in any one locality, but seems to be widely distributed through the section.

21. NEGUNDO ACEROIDES Moench. Common along Montezuma Creek, but not at the lower end.

22. RHUS CANADENSIS Marsh. This differs from the ordinary form of var. *trilobata* in that the leaves are simply crenate. It was collected in Court House Wash.

23. ASTRAGALUS AMPHIOXYS Gray. Court House Wash, McElmo Creek, and Montezuma Cañon. The most widely-distributed Astragalus of the region.

24. ASTRAGALUS BIGELOVII Gray. Usually found on piñon and cedar covered mesas.

25. ASTRAGALUS GEYERI Gray. Court House Wash.

26. ASTRAGALUS HAYDENIANUS Gray. Montezuma Creek.

27. ASTRAGALUS LONCHOCARPUS Torr.(?) Court House Wash.

28. ASTRAGALUS SCAPOSUS Gray. McElmo Creek.

29. ASTRAGALUS PICTUS Gray var. ANGUSTUS Jones. Montezuma Creek.

30. ASTRAGALUS PREUSSII Gray. Common at Moab.

31. ——— var. SULCATUS Jones. Cane's Spring.

32. ASTRAGALUS DESPERATUS Jones. McElmo Creek; San Juan River.

33. ASTRAGALUS PALANS Jones. Montezuma Creek.

34. ASTRAGALUS COLTONI Jones. Court House Wash.

35. ——— var. FOLIOSUS Jones. This is the form found at Monticello. It was collected in flower and green fruit.

36. ASTRAGALUS PATTERSONI Gray. This species seems to be widely distributed on the western slope, growing in alkaline soil.

37. CÆSALPINIA repens n. sp. Perennial, 9 to 13 cm. high, from slender, woody, creeping rootstocks; leaves and peduncles crowded on a short stem, canescent with short, curled hairs; leaves with from 5 to 7 pinnæ, leaflets 4 to 6 closely appressed, nerveless, with a few scattered, depressed glands varying in shape, usually irregular in outline (many leaflets are without the glands); stipules ovate-acuminate, petioles ribbed, a little longer than the blade, with several long, lax bristles where the pinnæ join the axis, and one at the base of each leaflet; peduncles stout, ribbed, surpassing the leaves, covered closely with the short, white hairs, and with occasional longer ones similar to the lax bristles on the leaves; flowers at first erect, closely clustered, pedicels becoming deflexed and distant in the fruiting, elongating raceme; four upper sepals lanceolate, lowest oblanceolate, covered with longer white hairs than the rest of the plant; without glands, as is also the corolla; petals surpassing the sepals, obovate, tapering to the short claw, 8 to 12 mm. long, 3 mm. broad, smooth except the vexillum, which has a broad, hairy claw; stamens with filaments about 10 mm. long, broadening at base, smooth above, ciliate with blunt, coarse hairs below, densest at the base; style cylindrical, broadening at the base, and to a less degree at the ciliate campanulate stigma, which is slightly hairy below; legume at first canescent with short, curled hairs, orbicular to obovate; in age with hairs so scattered that it is no longer canescent, becoming reticulate with prominent transverse veins, flat, with a thickened margin, varying from orbicular to elliptical and oblong, usually abruptly pointed with the persistent style, entirely without glands, 1½ to 3 cm. long, 1½ to 2 cm. broad; seeds usually two. This grew in sandy soil, and formed loosely-spreading mats. It was collected in Court House Wash, near where it comes into the Grand River, on the opposite side from Moab, in southeastern Utah, May 26, 1892.

The pod is very different in appearance from that of others of this genus. The character of its glands excludes it from the sections proposed by E. M. Fisher in his recent revision of Hoffmanseggia. Since he has with good reason reduced Hoffmanseggia to Cæsalpinia in Bot. Gaz. xviii, 4, this Utah plant

which by the old classification would be Hoffmanseggia becomes Cæsalpinia. Plate XXVI.*

38. LATHYRUS PALUSTER L. Along the bottom of Montezuma Creek.

39. LUPINUS SHOCKLEYI Watson. Scarce. On the road from Thompson's Springs to Moab.

40. LUPINUS PUSILLUS Pursh. Abundant. But not seen after leaving Moab.

41. PSORALEA CASTOREA Watson. Along the side of a sandy wash.

42. TRIFOLIUM PLUMMERÆ Watson. Under the cedars and piñons at the head of Montezuma Cañon.

43. AMELANCHIER ALNIFOLIA Nutt. This is a peculiar form of this widely distributed species, collected in Court House Wash. It differs from the form common in Colorado, in the leaves smaller, less veiny, and more glossy on the upper surface, the branches are straggling, flowers and leaves few; so that the observer is first attracted to the difference by the less compact form of the Utah variety.

44. CERCOCARPUS PARVIFOLIUS Nutt. Near Monticello.

45. COWANIA MEXICANA D. Don. On rocky hills and mesas.

46. PRUNUS DEMISSA Walt. In deep cañons near water.

47. PURSHIA TRIDENTATA DC. Common on the hills and mesas, but less so than in Colorado.

48. ŒNOTHERA PINNATIFIDA Nutt. Thompson's Springs.

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* EXPLANATION OF PLATE XXVI.

CÆSALPINIA REPENS: "A" longitudinal section of the pistil enlarged four times, showing the arrangement of the ovules; "B" the same showing the ciliate, sparingly hairy stigma; "C" stamen enlarged four times showing the peculiar hairs on the filament; "D" anther enlarged; "E" petals spread out, enlarged twice; "F" calyx spread open, enlarged twice; "G," "H" pods nearly ripe to show difference in shape; "I" end of pod enlarged to show the venation; "J" a piece of the stem near the base to show the ribs and little spines; "K" leaf enlarged showing inner and outer surface; "L" another leaf enlarged much more showing the glands and hairy surface.

49. ŒNOTHERA CARDIOPHYLLA Torr. Near Moab.

50. ŒNOTHERA SCAPOIDEA Nutt. Thompson's Springs.

51. ŒNOTHERA TRICHOCALYX Nutt. Thompson's Springs, and in other places along the route. The notes on the species of this genus were published in Zoe, vol. iii, No. 3.

52. MENTZELIA MULTIFLORA Gray. In bloom in the evening along the sandy bottom of Court House Wash; the flowers were all closed the next morning.

53. ECHINOCACTUS WHIPPLEI Eng. & Big. On the road to Monticello not far from Window Rock.

54. OPUNTIA MISSOURIENSIS DC. Court House Wash. This was a rare plant and a peculiar form with long, very slender white spines.

55. CYMOPTERUS PURPUREUS Watson. In Montezuma Cañon on a rocky hillside. At Durango it grows under the piñons.

56. CYMOPTERUS MONTANUS T. & G. This is the rather tall form found also at Grand Junction and Durango. On alkali deserts not uncommon.

57. COLOPTERA NEWBERRYI C. & R. In Court House Wash, and on a mesa after leaving Moab. It seems to approach Cymopterus, and the spongy wings ought not to be regarded as a generic difference since there are often both flat and spongy wings on the same fruit.

58. GALIUM MATHEWSII Gray. This dicœcious Galium is widely distributed through this region and no special locality was noted. It usually grows on the sides of cañons or gulches.

59. BRICKELLIA MICROPHYLLA Gray. Court House Wash, along the cañon walls; a fall bloomer.

60. BRICKELLIA LINIFOLIA Eaton. Court House Wash, in the same locality as the above. In bloom in May.

61. APLOPAPPUS ARMERIOIDES Gray. Found under piñons and cedars.

62. APLOPAPPUS SPINULOSUS DC. This form with unusually large flowers and erect stems grows along by McElmo Creek. The species is variable.

63. TOWNSENDIA STRIGOSA Nutt. Common on the road to Moab and along McElmo Creek.

64. TOWNSENDIA FENDLERI Gray. Usually found growing on mesas through the whole region.

65. ASTER FRONDOSUS T. & G. Court House Wash.

65*a*. ASTER TORTIFOLIUS Gray? There are no glandular hairs or viscidity about this plant as in *A. tortifolius* and *A. Wrightii*, but it differs more essentially from *A. venustus* which it resembles in shape of leaves and manner of growth, though not so stout. It differs from *A. venustus* in the depressed hairs of the akenes which are pappus-like at the top, the ray flowers are violet with a hairy tube, akenes about half as long as in *A. venustus*, truncate instead of obovate, style branches about one-quarter as long. This with *A. Wrightii*, *tortifolius*, and *venustus* form a well-marked group, and future material and investigation may resolve them into one species.

66. ASTER TANACETIFOLIUS HBK. Thompson's Springs.

67. ERIGERON BELLIDIASTRUM Nutt. Along the road to Moab.

68. ERIGERON UTAHENSIS Gray. This sends up numerous branches from a woody stem. It was coming into bloom and seemed rare. Court House Wash, near the Grand River.

69. BACCHARIS SALICINA T. & G. On the banks of the Grand River near Moab.

70. ENCELIA NUTANS Eastwood. On the road between Thompson's Springs and Moab.

71. ENCELIA FRUTESCENS Gray. Along the walls of the cañon approaching the Grand River near Moab.

72. BAHIA NUDICAULIS Gray. Along McElmo Creek.

73. CHÆNACTIS STEVIOIDES Hook. & Arn. Common through the entire region. Sometimes becoming large, diffusely branching plants.

74. TETRADYMIA SPINOSA Hook. & Arn. Widely distributed. Thompson's Springs.

75. SENECIO AUREUS L. var. This variety is common under cedars and piñons in Western Colorada and Eastern Utah.

76. CNICUS NEO-MEXICANUS Gray. Abundant and conspicuous on hills along McElmo Creek.

77. STEPHANOMERIA EXIGUA Nutt. Near Moab. It opens in the early morning and closes before noon.

78. MALACOTHRIX TORREYI Gray. Common throughout the section.

79. GLYPTOPLEURA MARGINATA Eaton. Moab near the Grand River.

80. LYGODESMIA EXIGUA Gray. Along McElmo Creek, growing on a sandy hill.

81. FORESTIERA NEO-MEXICANA Gray. Growing in clumps along the San Juan River.

82. FRAXINUS ANOMALA Torr. Court House Wash.

83. AMSONIA BREVIFOLIA Gray. On the hillsides at Moab.

84. ASCLEPIAS CRYPTOCERAS Watson. This beautiful Asclepias was occasionally seen on the sides of washes. It is not common.

85. ASCLEPIAS INVOLUCRATA Engelm. var TOMENTOSA n. var. This differs from the description of the species and from specimens in the Herbarium of the California Academy of Sciences in the following characters: Tomentose throughout, leaves ovate-lanceolate, acuminate, sometimes orbicular; margins wavy and densely tomentose from 3 to 7 cm. long and from 1 to 2 cm. broad at base. Umbel closely sessile with involucral leaves, densely white-tomentose and linear-lanceolate. There is, however, but little or no difference in the flowers. It grew along Court House Wash and the San Juan River near McElmo Creek, and was alike in both localities.

86. FRASERA ALBOMARGINATA Watson. This was seen growing on a piñon covered mesa along Montezuma Creek. It also grows in the same kind of a place on Mesa Verde in southwestern Colorado. It was not yet in bloom.

87. FRASERA PANICULATA Torr. (?) This was not collected as the plants were not yet in bloom. It was tall, loosely and paniculately branched and the memory of its appearance agrees

with the general description of the above species. It may be *F. Utahensis* Jones.

88. GILIA CONGESTA Hook. The plants collected in Utah, between Hatch's Wash and Monticello, grew on a piñon covered mesa and differed in the following points from the Grand Junction form, which grew in a dry water course: The Utah form has smaller flowers with corolla tube equaling the calyx. The Grand Junction form has the corolla tube twice as long as the calyx. The ovules are less numerous in the Utah form. Both have the corolla lobes from entire to tridentate, at the apex.

89. GILIA LONGIFLORA Don. This was collected in Hatch's Wash with the tube of the corolla more than inch long.

90. GILIA PUNGENS Benth. This is the large white-flowered form with very small leaves in interrupted fascicles. In Montezuma Cañon.

91. GILIA INCONSPICUA Dougl. Near Moab and along McElmo Creek.

92. GILIA LEPTOMERIA Gray. Collected at Moab. This seems very near to *G. inconspicua*.

93. GILIA GUNNISONI T. & G. Common in Court House Wash.

94. GILIA TRIODON n. sp. Annual, from ten to twenty cm. high, branching diffusely upwards from the base with numerous slender branches, stipitate glandular throughout except the parts of the flower within the calyx, leaves clustered at the root, thickish, runcinate pinnatifid into nine or ten divisions, which are either entire or dentate, the teeth often tipped with short bristles; stem leaves bract-like, diminishing upwards; small flowers numerous scattered along and terminating the branchlets; calyx campanulate, two to three mm. long, cleft half way down with five or sometimes six green tipped bristle-pointed lobes, the membranous lower part folding in like a fan; corolla minute, salver-form, the tube exserted, tapering from a broad base to the throat, divisions tridentate, with middle tooth longest, and the sinuses rounding, minutely tuberculate; stamens with slender filaments and cordate acuminate anthers; pistil with the stigma

club-shaped, obscurely tridentate; ovules numerous; capsule slightly surpassing the calyx, seeds tuberculate developing spiricles and mucilage. In habit this seems to belong to Eugelia; but it differs from all described Gilias in having no style branches, but instead a club-shaped tridentate stigma. Collected June 20, 1892, in Ruin Cañon, a branch of the McElmo and near the boundary line between Colorado and Utah. It was named from the appearance of the stigma and petals.

95. GILIA SUPERBA n. sp. Stems one or several from a woody tap root, each with a rosulate cluster of leaves at base, cymosely branched above, or even diffuse from near the base; glutinous throughout; radical leaves varying from spatulate and entire to obovate-cuneate, with margins crenately to incisely dentate, with apiculate teeth, tapering into margined petoiles, which are often purplish on the mid-nerves and at the base; 3 to 5 cm. long; cauline leaves few and scattered, sessile, incisely dentate, small, and decreasing upwards into linear-subulate bracts; flowers clustered at the ends of the long, almost naked peduncles, on pedicels equalling or shorter than the calyx; calyx open campanulate, the five triangular-acute lobes about equalling the tube, purplish, dotted with stipitate glands; corolla crimson, velvety in texture, salver-form; tube about three times as long as the calyx, widening upwards, lobes obovate, shorter than the tube, about 5 mm. broad; stamens equally inserted and wholly included; style as long as the corolla tube, surpassing the stamens; ovules numerous (about fifty); immature seeds irregular in shape, with a loose, crumpled outer coat, fewer than the ovules. (Plate XXVII.)

This beautiful and showy Gilia belongs to the section Ipomopsis, and comes nearest to *G. Haydeni*, with which it has been directly compared, not only with specimens from the type locality, but also with the type itself, in Mr. Brandegee's Herbarium. This is either a winter annual or a biennial, while *G. Haydeni* is perennial, the cauline leaves are more bract-like and fewer, it is less diffuse but taller, larger, and much more glutinous, the calyx is more spreading and with the lobes not membranously margined; the stamens of *G. Haydeni* are protruded beyond the tube, and the stigma is below them; in *G. superba*

the opposite is the case; the ovules are much more numerous in this species, and shaped differently.

The plants were collected at Hatch's Wash, in southeastern Utah, between Moab and Monticello, on May 29, 1892. They were abundant in a limited area, on sandy knolls formed by the accumulated sand that had been washed down from the basin-like sides of the shallow cañon, and were not met with at any other place.

96. PHLOX NANA. Growing at the base of a cliff between Hatch's Wash and Monticello.

97. PHACELIA NUDICAULIS n. sp. Annual, low, and almost prostrate, stems several (4–7) from the root, naked to the inflorescence, nodes 1–2 cm. long, internodes shorter; glandular and hirsute, with short, white bristles; leaves thick, orbicular, or broadly ovate, abruptly tapering to the petiole, blade about 1 cm. long by not quite so broad, petiole equalling or surpassing it in length, margins slightly undulate and revolute; radical leaves few; cauline, crowded at the ends of the branches, surrounding and almost hiding the flowers, which are solitary in the forks of the branches or in few flowered spikes which are cymosely arranged; sepals linear-spatulate, united at base, spreading, and surpassing the capsule; corolla 3 to 5 mm. long, surpassing the immature calyx, violet, tubular funnel-form, with rounding lobes acute or obtuse, hairy on the outside but smooth within, the folds at the base linear and attached to the stamens; filaments smooth, equally inserted, but of unequal lengths; style cleft half-way down, with capitate stigmas, hairy to the forks; capsule blunt, hairy; seeds about 16, oblong, pitted, variable in thickness, from flat to lens-shaped, probably modified by the pressure from each other in the crowded cells.

This desert Phacelia was collected on the road from Thompson's Springs to Moab, May 24, 1892. It grew on a flat, adobe desert with *Cleomella plocasperma* (?), and was abundant over a very limited area. It most nearly approaches *P. cephalotes* Gray, from which, however, it is quite distinct.

98. PHACELIA CEPHALOTES Gray. This presents some very interesting variations in the style branches. In some flowers it

is undivided and capitate, in others with two distinct capitate stigmas, while in others the styles are distinct for about 1 or 2 mm. The calyx and corolla often have six divisions; the seeds are honeycombed. Collected on a sandy flat in Montezuma Cañon, June 1, 1892.

99. PHACELIA CRENULATA Torr. Moab. This is very common also at Grand Junction on the mesas.

100. CONANTHUS ————. Collected at Thompson's Springs May 23, 1892. This is similar to the plant distributed by Wm. C. Cusick and named by Dr. Gray *C. parviflorus*; but it was never published.

101. COLDENIA HISPIDISSIMA Gray. On the hills around Moab and in Court House Wash.

102. KRYNITZKIA LEUCOPHÆA Gray. Common on mesas through the whole region.

103. KRYNITZKIA PTEROCARYA Gray. Near Moab.

104. KRYNITZKIA ————. Court House Wash. This is left undescribed and undetermined until time can be given to a most interesting collection of this genus.

105. DATURA METELOIDES DC. Common in the dry bed of McElmo Creek and along the banks.

106. LYCIUM PALLIDUM Miers. Montezuma Cañon near the San Juan River and McElmo Cañon. This prevailed in occasional tracts.

107. NICOTIANA ATTENUATA Torr. Ruin Cañon. Widely distributed.

108. CHAMÆSARACHA CORONOPUS Gray. Montezuma Cañon and where the McElmo joins the San Juan. The star-like flowers open towards evening.

109. PENSTEMON EATONI Gray. Court House Wash and other cañons on the road. This is one of the most showy penstemons and worthy of cultivation.

110. PENSTEMON UTAHENSIS n. sp. Stem erect, one or several from the root, one to two feet tall, glaucous and glabrous throughout; radical leaves from spatulate, about two cm. wide,

to oblanceolate, five to eight cm. long by one cm. wide; siightly wavy; stem leaves far apart, about eight cm. between the lowest pairs, less above, oblong, sessile by a clasping base, diminishing upwards; flowers in an interrupted loosely and few flowered thyrse; calyx small, divisions abruptly pointed and thicker at the apex; corolla funnel form, two cm. long, lobes large, orbicular and spreading, three to five mm. broad, carmine; two stamens inserted at the base of the carolla; the others even with the sterile filament which is hooked at the glabrous end; style broadening to the paddle-shaped stigma and to the pointed ovary.

Were it not for the tip of the sterile filament this would unhesitatingly be placed with *P. Parryi*, but if that distinction is worth anything it must belong to the next group near *P. grandiflorus* which it is as unlike in all the other characteristics whereby it resembles *P. Parryi*. It is a beautiful and showy plant. The very glaucous foliage softens the bright carmine flowers which are velvety in texture and of beautiful shape with the round evenly spreading lobes of the funnel form corolla. It was collected between Hatch's Wash and Monticello, May 28, 1892; also on the San Juan River near where McElmo Creek enters.

111. APHYLLON MULTIFLORUM Gray. Along McElmo Creek, June, 1892.

112. POLIOMINTHA INCANA Gray. This was collected in Court House Wash on the Sandy Flat near the Grand River. It has a large prostrate woody stem and usually forms a knoll, from the sand collecting around its firm base. The numerous branches are slender and erect; the foliage is silvery canescent and the flowers a lovely blue. It has a sweet perfume.

113. HEDEOMA DRUMMONDII. In a branch of McElmo Cañon.

114. ABRONIA TURBINATA Torr. Thompson's Springs.

115. ABRONIA MICRANTHA Torr. Thompson's Springs and on the road to Moab.

116. ABRONIA CYCLOPTERA Gray. In the same localities as the two above; but more abundant than either.

117. ATRIPLEX ARGENTEA Nutt. Along the San Juan River and elsewhere.

118. ATRIPLEX NUTTALLII Watson(?). This differs somewhat from the species and may be new. The material is hardly sufficient for satisfactory determination.

119. GRAYIA BRANDEGEI Gray. Blooming plants were collected on a hill near McElmo Creek. They were not far enough advanced for good specimens but could be distinguished from the Atriplex which they resemble.

120. GRAYIA POLYGALOIDES Hook. and Arn. Common at Thompson's Springs. A form with very large fruit was found near McElmo Creek.

121. SARCOBATUS VERMICULATUS Torr. Widely distributed along streams. Montezuma Creek.

122. ERIOGONUM THOMASII Torr. Court House Wash, near Moab, growing along the rocky cañon walls.

123. ERIOGONUM INFLATUM Torr. Common on the desert plains and the cañon sides. It is called trumpet-weed at Moab. The inflation is almost globular in the plants of the plains, but long and narrower on the hill-side forms, which also grow much taller than the others. The inflated portion is empty, not containing a drop of moisture. Growing with the inflated plants are many smaller plants destitute of the swelling.

124. ERIOGONUM GLANDULOSUM Nutt. Montezuma Creek.

125. ERIOGONUM DIVARICATUM Nutt. Montezuma Creek.

126. ERIOGONUM SALSUGINOSUM Nutt. Montezuma Creek.

127. RUMEX VENOSUS Pursh. Near the spring on the road to Moab.

128. EUPHORBIA FLAGELLIFORMIS Engelm. Young plants of this were coming up, the old ones were near by, the dry stems containing fruit, so the species could be determined from all the material. Near the Grand River, in Court House Wash, and on the San Juan flats.

129. CELTIS OCCIDENTALIS L. Along McElmo Creek and in the branch cañons.

130. QUERCUS UNDULATA Torr. There were two distinct forms or two species. One had deciduous leaves, the other evergreen. They grew together in Hatch's Wash.

131. SALIX ———. This was not collected, for it was out of flower and fruit.

132. POPULUS AUGUSTIFOLIA James. Montezuma Cañon.

133. ALLIUM NEVADENSE Watson (?). This was collected on a mesa between Cane's Spring and Hatch's Wash. It also grows at Grand Junction, and is distinguished chiefly by an offshoot from the veiny-coated bulb.

134. CALOCHORTUS NUTTALLII Torr. & Gray. Montezuma Cañon.

135. CALOCHORTUS FLEXUOSUS Watson. Along McElmo Creek.

136. HESPERANTHES ALBOMARGINATA Jones. On the road to Moab in a desert flat.

137. BLEPHARIDACHNE KINGII (Watson) Hack. This is *Eremochloe Kingii* Watson of King's Report.

138. STIPA PENNATA L. var. NEO-MEXICANA Thurb. On the mesas near McElmo Creek.

139. EPHEDRA TRIFURCA Torr. In a cañon between Hatch's Wash and Monticello. Collected in good fruit.

140. JUNIPERUS OCCIDENTALIS Hook var. MONOSPERMA Eng. The common Juniper or cedar of the mesas.

141. PINUS EDULIS Eng. The piñon or nut pine, found usually with the Juniper named above.

These were all noted or collected on the trip from Thompson's Springs to McElmo creek at the Utah line. Many extended also into Colorado; for state lines make no difference in the flora. However, as the list is headed "Utah Plants," it is best to stop at the boundary line. The route was from Thompson's Springs to Moab, from there by way of Hatch's Wash to Monticello, then down Montezuma Cañon to the San Juan River, and thence up the McElmo. The time was between May 24 and June 3, 1892. The general description of the country was given in Zoe iii, 4.

DESCRIPTION OF A LUMINOUS LARVA FOUND NEAR HOLBROOK, ARIZONA.

BY C. H. TYLER TOWNSEND.

On the night of June 27, 1892, while camped about five miles west of Holbrook, Arizona, I found a luminous larva running over the ground. The prothoracic segment was especially and continuously luminous, while the other segments, especially the more terminal ones, were all more or less so. Each segment was luminous for a certain space about the centre of its dorsum, and thus taken together they looked like a string of beads in the dark, the prothorax, however, being wholly luminous.

The larva is coleopterous. It does not much resemble an elaterid larva, while it is equally unlike a lampyrid. It differs in its shape, and also very markedly in its characters, from the supposed larva of *melanactes* figured by Riley and described by Bethune and Osten Sacken.* It further differs very strikingly by the luminosity not being located in the same regions of the larva as those indicated in the figure above referred to. Instead of being at the side of each segment, and at the incisures, the centre of the segments is luminous, according to my notes. These notes on the luminosity of the larva were made in the field at the time, and the details have since escaped my memory. But I do not think that I mistook the incisures for the segments.

Description of larva. Length, hardly 12 mm.; greatest width (segs. 9-10), 1¾ mm. Whitish in color originally; changed by immersion in alcohol to a pale rufous above and pale flavous below. Elongate, of nearly equal width, but slightly narrowed anteriorly, and posteriorly flattened. Consisting of thirteen segments, rather chitinous on whole surface, especially on dorsum, head, and ventral thoracic portion. Head retracted within the prothoracic segment, the third to twelfth segments each retracted for about its anterior one-third within the next segment anterior to it. Second or prothoracic segment elongate, longer than any of the other segments, gradually narrowed

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* Riley, Amer. Ent., iii, 202; and LeBaron, 4th rep., 99.—Bethune, Can. Ent., i, 2.—Osten Sacken and Bethune, Can. Ent., i, 38–9.—Osten Sacken, Proc. Ent. Soc. Phil., 1862, 125, pl. 1, f. 8; and iv, No. 2, 8.

anteriorly where it is but little wider than the head. Segments three to eight equal in length, each hardly two-thirds length of second, very gradually widening to eighth, which is but little wider than three; segments nine to twelve a little longer, hardly wider than others; thirteen a little longer than twelve, not as long as second, a little narrowed and rounded off behind, with a segment-like anal joint or appendage which shows very plainly on the ventral surface, making the larva appear fourteen-jointed, and is doubtless homologous with the so-called anal proleg, though it does not appear to possess this function in the present case. All the joints except head covered dorsally with fine short posteriorly directed bristly hairs, longer and directed more outwardly on sides, extending down on lateral ventral surface; median ventral surface less distinctly short hairy except on thoracic segments. Head bears some bristly very short hairs on edges. A moderately large black convex simple eye on outer anterior edge of head, rather prominent, partially hidden by the head being retracted within the overlapping anterior dorsum of prothorax. Antennæ short, situated just anterior to and inside of eyes; basal joint stout and rather tubercular, second joint smaller, about as wide at base as long, subconical, bearing some bristly hairs; third joint minute, as long as broad, terminated by a few short hairs. Mandibles apparently single-toothed, blackish, curved, and rather claw-like, not stout. Maxillæ two-jointed, stout, the joints rather cylindrical; second joint as long as wide, but narrower than the basal. Maxillary palpi small, apparently two-jointed, the second joint but little smaller than the basal. Labial palpi very small, slender, two-jointed, the joints short and subequal; an anterior prolongation of the labium between them surmounted by two fine hairs. Prothoracic segment deeply notched anteriorly below with a V-like fold of the integument extending not quite to its posterior margin, exposing what seems to be a separate sclerite belonging to the prothoracic segment. Spiracles situated about middle of lateral edges of segments five to twelve inclusive, but appearing anterior to middle when the segment is retracted. Legs apparently four-jointed, basal joint elongate, appearing as a prolongation of the integument; second joint short, about one-half

as long as basal joint, third and fourth joints about equal in length, twice as long as second, the fourth tapering to its extremity, which is terminated by a slightly curved, rather elongate chitinous claw or hook. The last three joints of the legs are furnished with a sparse fringe of small bristly spines on inside.

Described from one specimen. Arizona.

A luminous larva was reported to me, in the spring of 1892, as numerous in the Mimbres country, in Grant County, New Mexico. No specimens, however, were obtained.

NOTES ON THE FLORA OF GUADALUPE ISLAND.

BY F. FRANCESCHI.

The Island of Guadalupe has been botanically explored first in 1875 by Dr. Edward Palmer, and second by Prof. E. L. Greene in 1886, Dr. Palmer having made a short visit there and collected again in 1889. For a newcomer there was in consequence but little hope to find anything that had escaped such experienced and diligent observers; the more so as it was well known that the work of extermination of that most interesting flora, due to the wonderful increasing of wild goats there, had gone on unabated these last ten or twelve years. My purpose in visiting the island, rather than the hope of adding to the number of the plants registered already by Dr. Palmer and Prof. Greene as belonging to Guadalupe, was to gather more information on the present state of vegetation on the island, and full particulars on the appearance, the habit, the flowering, and fruiting of many of the trees and shrubs peculiar to Guadalupe, of which a few have been sparingly introduced in gardens, and others well deserve to be. For detailed accounts on the palm, the cypress, the pine, and the oak of Guadalupe, as well as on the most noteworthy shrubs, I must refer to papers sent to "Garden and Forest," of New York, and to the "Gardener's Chronicle," in London. A few remarks of a more general character will, I hope, be found of interest as preceding the list of plants I was able to collect there during December and part of January last.

The Island of Guadalupe, situated between 29 degrees latitude north, and about 150 miles west of the coast of Lower California, measures nearly nineteen miles in length from north to south, by six to seven in breadth. The highest peak, Mount Augusta, reaches 4,500 feet, but is hardly to be noticed as it stands near the centre of the island, only a few hundred feet higher than the surrounding plateau. Guadalupe is not exactly a table-land, as it has been described, but rather a succession of several plateaus at different altitudes, of ridges, of old craters, and of powerful lava dykes appearing to have sprung out from various points and flown in every direction. The volcanic action which formed the island—now entirely subsided, there being no trace of thermal waters nor of gaseous emanations of any description—must have been grand and powerful indeed, if one considers the remains of the circus of the primitive crater in the north part of the island, rising to more than 3000 feet above the sea level and fully four miles in diameter. Two-thirds of this circus still exists, the eastern part of it having been swallowed by the ocean in some later convulsion, and at the southern part, towards the centre of the island, this high ridge blends with the plateau where Mount Augusta rises, this last offering no trace of eruptive crater, but of having given birth to immense currents of lava, most of them now covered with cypresses.

The standing portions of the circus emerging from the sea on the north and northwestern side of the island are exceedingly steep and precipitous, cut by a few deep cañons, and with some adventitious and comparatively small cones of eruption. Just on the slope of one of them is to be seen the principal grove of palms (*Erythea edulis*) with a few intermingled fine specimens of oaks and many more pines, the latter extending all over the northern part of the island, which in times past they must have covered with a very thick forest. The immense crater was once filled up to the height of 2000 to 2500 feet, and a section of this plateau remains still unaltered in the shape of a crescent, its surface rising gently from north to south. Here are to be found the sole appreciable springs of water, evidently nourished by the fogs that at all seasons are very often brought by the predominating northwest winds against the high overstanding ridge and

there deposited. The few scattered pines still living on the ridge afford a fine example of the power of trees in condensing and storing water. When a strong wind blows the fog up from the ocean, while the surrounding ground looks hardly wet, under the pines it will be pouring hard with streamlets of water running from the base of their trunks. For this peculiar office the acicular leaves of the pines are eminently adapted, and one can easily understand that when all the northwestern part of the island was clothed with a dense pine forest, springs must have been much more abundant, and the vegetation on the eastern side must have largely benefited by them. The springs are not far from each other and nearly in the centre of them are the cabins built a few years ago by the International Company of Lower California, which has since abandoned the lease of the island as unprofitable.

The increase in the number of wild goats has gone on these last years unchecked by the few thousand which may have been killed by the poachers who visit the island from time to time. The result is vividly shown by the fact that in all my ramblings over the island I was unable to find but one single shrub, *Ceanothus crassifolius*, alive in any of the places inaccessible to goats. Endowed as these are with proverbial climbing ability, the more so when pressed by hunger, the few plants that have escaped destruction are those growing on the perpendicular basaltic cliffs, accessible only to winged creatures, and old trees with bark too hard and woody to offer any food. Most of the shrubs and perennials seem not to be much adapted to assume a "rupicole" habitus, seedlings being exceedingly scarce, so that in a few years' time many of the species, represented now by a very limited number of individuals, will be entirely lost. The same fate, in a longer period, is likely to be shared by the trees of which at present only the cypresses and palms are growing in large numbers, no reproduction being possible, as all seeds falling to the ground are devoured by goats or by mice. It is wonderful to see how kids a few months old, far from starving, are able to break and chew the kernels of the palm, hard as marble as they are. Anyone who has traveled along the Mediterranean basin, especially in some parts of Turkey and

Greece, must have acquired a fair idea of the destructive power of goats; but what is to be seen in Guadalupe far surpasses any anticipation.

It would appear at first that annuals, unprovided by nature with a perennial or woody axis, ought to have been the first to disappear; but just the contrary has happened, probably owing to the circumstance that the cycle of evolution of an annual plant (more so in such a dry region) is exceedingly short, and coincides with the period of most plentiful production, so that there is much more chance of the ripening of an abundant crop of seed which, by its minuteness and unattractiveness, escapes destruction and assures a large reproduction of the species. Shrubs and perennials are exposed all the year round to the destructive teeth of the goats, and it is a well-known fact that no matter how hard and enduring the vitality of such plants, in the long run they are unable to survive the constant clipping of their aerial parts.

Among the plants collected by myself in Guadalupe, annuals could not be numerous, owing to the season of the year, and very little was added to the island record. I was able, however, to secure a small plant of what appears to be a Heuchera, probably the unidentified species collected, in 1875 only, by Dr. Palmer, and a plant also of a Cotyledon—no species being described from the island. Among cryptogamous plants *Parmelia physodes* L. var. *enteromorpha* Tuck., *Usnea barbata* L., *Ramalina homalea* Ach. are not to be found in the already published lists; all of them are known, however, on the mainland of California.

The figures following the species are the serial numbers of the collection.

Crossosoma Californicum Nutt. Only one specimen found with few flowers; in bloom about the middle of December. Growing on the almost inaccessible cliff of the lower circus east of the cabins. (42.)

Eschscholtzia Californica Cham. Plentiful in the same limited locality pointed out by Prof. Greene; positively perennial; its leaves clipped pretty closely by goats. (19.)

Eschscholtzia elegans var. *ramosa* Greene. Rather plentiful not only along the beach north of the landing, as noticed by

Prof. Greene, but also in the dry bed of the cañon and on the bare dry rock at the mouth of it, and a single specimen found on the ridge of the lower crater about the centre of the island east of Mt. Augusta. All these plants appear to be annual, but apparently the same species grows luxuriantly as a perennial on a nearly inaccessible cliff of lava detritus on the right bank of the cañon 500 or 600 feet from the landing. These plants were already in flower at the beginning of January. The flowers have no greenish tinge at all; petals not over two-thirds of an inch long. (20.)

Oligomeris subulata Boiss. Cañon near the landing. (64.)

Lepigonum macrothecum F. & M. Seen only on a perpendicular cliff on the right bank of the cañon, not far from the landing; growing there in number. Specimens of a Silene—dried stocks of the preceding year were abundant near the landing. (29.)

Claytonia perfoliata Donn. Quite common from centre to north, most luxuriant under the palms where it was in flower early in December. (53.)

Lavatera occidentalis Wats. A few scattered specimens, all on the most inaccessible rocks east of the island. A few seedlings not likely to survive found in several localities. (12.)

Malva borealis Wallm. Now a common weed; apparently not liked by the goats. (54.)

Sphæralcea sulphurea Wats. Much more abundant than Lavatera, one of the very few plants of which some meager specimens may be seen scattered about even in places occasionally visited by goats. Seedlings and young plants observed near the landing both on the beach and on the dry lava rock. (13.)

Erodium moschatum L'Her. Plentiful all over, chiefly among rocks and stones; not so much so, however, as *Erodium cicutarium* which now literally covers the whole surface of the island. *E. moschatum* appears not to be liked by goats, at least where other food is obtainable. (22.)

Ceanothus crassifolius Torr. Twelve to fifteen feet high. Only one plant found alive near the centre of the island west of Mount Augusta, among the cypresses, but surrounded by what appear

to be the dead stumps of thousands of its brethren, which must have formed a thick and general underwood not only in the larger cypress grove, but also in the smaller near the springs and cabins. Later three or four more living plants were found in the upper grove. (6.)

Rhus laurina Nutt. Probably the same four plants seen by Dr. Palmer, growing not far apart on the basaltic cliff east of the cabins. Another specimen too high up to be surely identified was seen on the right bank of the cañon near the landing. (9.)

Lupinus niveus Wats. Apparently annual, a few seedlings found in different localities, but chiefly on the flat ground next to the large spring south of the cabins. (23.)

Trifolium amplectens T. & G. Seen only in the cañon near the landing, but not in large numbers. (26.)

Trifolium Palmeri Wats. In the same locality, but much more abundant. (27.)

Hosackia argophylla Gray. Very few seedlings, observed only on the beach north of the landing. (24.)

Heuchera ———. Single specimen not in flower.

Cotyledon ———. Only one small plant on a rock along the trail not far from the landing.

Echinocystis Guadalupensis Naud. Seen only among rocks on the right bank of the cañon not far from the landing, but I was assured that it grows all over the island. Young shoots appeared about the middle of January. (47.)

Opuntia prolifera Engelm. Observed but not collected.

Galium ———. Two species; plentiful in many places, but chiefly under the palms. Not collected.

Filago Californica Nutt. Very plentiful. (25.)

Diplostephium canum Gray. Only one plant seen, in such an inaccessible position on the cliff of the lower circus near the corral, that it was impossible to secure more than a few scanty specimens. (41.)

Eriophyllum ———. Woody, perennial, on a rock near the cabins. (61.)

Perityle Californica Benth. Quite plentiful near the landing along the beach in the bed and on the banks of the cañon; in flower beginning of January. Not seen anywhere else. (46.)

Perityle incana Gray. By far the most abundant of all the shrubs still living on the island and the most likely to survive under the unfavorable circumstances, as it seems quite at home on the more precipitous cliffs, and young plants and seedlings are abundant in the crevices of the rocks. A few straggling flowers appeared as early as the middle of December. (7.)

Matricaria discoidea DC. Plentiful near the springs, on wet ground, which it covers with a dense and tufted carpet; larger specimens were collected at the spring west of the cabins, where they were already blooming at Christmas. (30.)

Artemisia Californica Less. Basaltic cliff east of the cabins in considerable number, also a mile or so to the north. (11.)

Senecio Palmeri Gray. Very conspicuous and much whiter even than *Perityle incana;* perhaps three dozen specimens seen on the eastern cliff above mentioned. (10.)

Microseris linearifolia? Gray. (56.)

Sonchus oleraceus L. Very common in the bed and on the banks of the cañon near the landing.

Dodecatheon Meadia L. Robust, large-leaved specimens. Most abundant only between the trail to the cabins and the cliff; the finest on the very ridge. Goat-hunters, short of tobacco and attracted by the leaves, have used them as a substitute. They are said to have a most pleasant flavor. (31.)

Gilia Nevinii Gray. Cañon near the landing and very common among rocks over the whole island. Not liked by the goats. (57, 59.)

Nemophila racemosa Nutt. Already in flower early in December on the northwestern part, under the palms. It grows plentifully among rocks all over the island. The goats appear not to like it. (32.)

Ellisia chrysanthemifolia Nutt. (56 bis.)

Phacelia phyllomanica Gray. A most elegant shrub with finely cut foliage, dark green above and whitish below; a con-

siderable number of plants in a limited locality on the cliff east of the corral. (43.)

Emmenanthe penduliflora Benth. Cañon near the landing. (58.)

Krynitzkia maritima Greene. Seen only near the mouth of the cañon, near the landing; beginning to flower in January. (33.)

Krynitzkia foliolosa Greene. Cañon near the landing. (55.)

Convolvulus macrostegius Greene. Highly relished by goats, but still keeping its hold on the most perpendicular cliffs where its drooping deep green masses form a striking contrast to the silvery foliage of *Perityle Palmeri*. No seed could be found and I was only able to obtain a few seedlings. (8.)

Solanum Xanti var. *Wallacei* Gray. On the eastern cliff a little south of the corral. A fine shrub worthy of cultivation, already in flower at the beginning of January, the rather large deep blue—not at all pale—flowers showing well on the deep green foliage. (15.)

Solanum nigrum Dunal. Not so rare as when Prof. Greene visited the island. A few found in crevices of the lower circus, more in the cañon near the landing; perennial but very herbaceous; flowers from white to lilac, quite minute and well distinct from the next. (16, 18.)

Solanum Douglasii Dunal. Perennial, with conspicuous star-shaped, pure white flowers, forming handsome bushes. Three plants found—two on the dike of lava on the southern side of the landing, and one a little way up the cañon. On account of its seeding freely even in winter it is quite likely that many more plants grow on the adjoining almost inaccessible slope overhanging the sea. (17.)

Mirabilis lævis Benth. Only near the landing but there quite plentiful, not only along the beach but also on the precipitous slope overhanging the sea, at the south of it, forming mats of pink flowers already at the beginning of January. (45.)

Chenopodium murale L. Rather common only near the landing. (63.)

Hesperocnide tenella Torr. Very common everywhere. (60.)

Quercus tomentella Engelm. In the northwestern part of the island with the palms. The trees are fine specimens forty to sixty feet high, remarkable for the grayish color of the bark and the size of the leaves, which are glossy dark green on the upper surface and covered with a somewhat rusty tomentum beneath. (4, 5.)

At the eastern part, right under the cliff of the inner circus grow some trees in two different localities more than a mile apart, which if not specifically distinct appear at least to be a very different form, not only by the leaves, but also by the bark which is darker and corky. These trees are rather stunted and branching from the base. No acorns or cupulæ were to be found. A few scattered oaks were also observed near the north end, and it is the only tree to be seen at the southern part. They appear not to grow above 1800 or 2000 feet elevation.

Erythea edulis Wats. Northwestern part of the island, the principal grove not less than one mile and a half long by half to one mile in breadth. There, and in the few other parts where palms are still growing in small numbers their range in altitude appears to be between three hundred and a thousand feet. A few expanded flowers were to be found already at the beginning of December, but the general blossoming takes place in January and the fruits are said to ripen in April. (1.)

Muhlenbergia debilis Trin. Only near the landing, on the beach as well as the banks and bed of the cañon. (34.)

Polypogon monspeliensis Desf. Plentiful only on saline soil around the springs near the corral; goats and donkeys appear to dislike it. (35.)

Cupressus Guadalupensis Wats. Centre of the island and around the springs; very variable in habit, in color, as also in the size and shape of the cones. The principal grove on the higher central plateau covers an area of not less than two or three square miles. (3.)

Pinus insignis var. *binata* Engelm. Only on the northern and northwestern part of the island, the finest trees growing amongst the palms. On some of the trees both the abnormal

two leaves and the normal three were to be seen on the same branch. (2).

Polypodium Californicum Kaulf. Rather scarce, always in shady or sheltered localities. (36.)

Gymnogramme triangularis Kaulf. The most widely spread fern, growing luxuriantly in the crevices of rocks with northern exposure, also in very dry sunny spots, but then much reduced in size. (38.)

Notholæna Newberryi Eaton. Nearly as common as the preceding and always in places fully exposed to the sun. A form is occasionally found associated with the first, but of a more slender habit and much more finely dissected leaves. (39.)

Pellæa ornithopus Hook. The more scarce fern on the island, seen only at the eastern side on basaltic rocks fully exposed to the sun. (37.)

Parmelia physodes L. var. *enteromorpha* Tuck. Exclusively on dead branches of cypresses. (48.)

Usnea barbata L. Growing on the living trunks of the palms, only on side facing the sea. (49.)

Ramalina homalea Ach. On rocks facing the sea among the palm grove, on the western side. (50.)

Physcia sp. ? Shady places in various parts of the island. (52.)

For the identification of the above mentioned species I am indebted to Mrs. Katharine Brandegee; for the lichens to Prof. E. L. Greene.

NOTE ON TERMOPSIS ANGUSTICOLLIS HAGEN.

BY C. H. TYLER TOWNSEND.

On February 11th, some large termites were brought to me, which had been found in galleries in dead or nearly dead cottonwood trees (*Populus Fremontii*), near Las Cruces, New Mexico. They consisted of soldiers, workers, and immature sexual individuals showing short wings.

Some specimens were sent to Dr. C. V. Riley, who wrote as follows: "The termite which you send seems to be identical

with the species which was determined for me some time ago by Dr. Hagen as *Termopsis angusticollis*. The specimens which I had received previously had come from California only, although I had received them from San Bernardino, Los Angeles, and Placer Counties."

The following are the measurements of the specimens, including another lot received about a week later:

Soldier: From tips of mandibles to extremity of abdomen is 20 mm.; mandibles are 5 mm. long; body, from base of jaws, 16 mm.; body, excluding head, 11½ mm.; head is a little more than 5 mm. wide.

Worker: 13 mm. long; head, 3½ to 3⅔ mm. wide.

Immature sexual individual: 13 mm. long; head, 3 mm. wide.

The workers and sexual individuals are pale straw color; the soldiers are same color, except that the head is more fulvous, becoming darker anteriorly, and the jaws are black. Smaller individuals than the above were also found. There were no fully winged individuals at this season.

This species is probably *Termopsis angusticollis*, which, with *Termopsis occidentis*, are the largest species of the family mentioned in Dr. Hagen's synopsis of the Neuroptera of No. Amer. (p. 3). The soldier described by Hagen under name *Termopsis occidentis* is not this species, as suggested by Hagen (l. c.). The soldier of the present species does not have the prothorax anteriorly emarginate, but nearly straight instead, and the meso- and meta-thoracic posterior angles are not specially produced.

Termopsis occidentis Wlk. (soldier, body 14 mm.) is described from the west coast of Central America. Dr. Hagen saw the type. *Termopsis angusticollis* Hagen (sexual individual, body 11 mm.) is described from Louisiana, California, and Puget Sound.

These termites are said to make longitudinal galleries in the cottonwood trunks, more or less parallel, running irregularly up and down, a couple of inches or so apart, and being about that much in diameter. A section of a stick containing galleries was brought me, from which I have taken the following measurements:

The stick contains some irregular galleries measuring from 2¾ to 3½ cm., approximately, in diameter, in some places more or less honeycombed, while they widen out in others into a sort of a chamber more or less irregular in shape, the one chamber in the stick being in the region of a knot which has been hollowed out. Small side galleries occur, one measuring 13 by 6 mm.; another, smaller, is 10 by 5 mm.; while a third is 8 by 20 mm. These galleries mostly run with the grain. The side of the largest gallery is 7 cm. in width, the other side being detached. Opposite the chamber this gallery widens to 7½ cm. The portion of the chamber contained in the stick is 7½ cm. one way, by from 1½ to 3 cm. the other. Another gallery is 6 by 2½ cm.; another, 6 by 1½ cm. The galleries are more or less lined with the frass from the termites. Then there are pockets: One, 2½ by 1½ cm. in diameter, and 5 cm. deep; another, 2½ by 1¼ cm., and 3½ cm. deep. Other pockets are smaller.

It is asserted by the foreman on the place from which these termites came, that they are frequently found in the live wood. A row of large cottonwoods along an acequia showed an unhealthy condition, and was cut down. Most of these were found to be mined by the termites. They seemed to prefer the more moist parts of the trees, either live wood or wood moistened by the proximity of the water in the acequia.

NATIVE HABITS OF SEQUOIA GIGANTEA.

BY GUSTAV EISEN.

One of the most beautiful of all trees, as well as one of the very largest, is our well-known *Sequoia gigantea*, or the California Big Tree. No tree known is so well adapted to be a "memorial" tree as this giant of the California Sierra Nevada, not alone on account of its size, which reaches 350 feet in height by 45 feet in diameter, nor by its beautiful and symmetrical form, in which it is not surpassed by any other coniferous tree, not even the famous cedars of Lebanon, Himalaya, and Atlas. But the chief advantage of the Sequoia for memorial planting is

its rapid growth coupled with its longevity. The largest trees in the Sierra must have reached an age of between 4000 to 5000 years. When the Cheops pyramid in Egypt was being constructed our largest Sequoias now standing were already youngsters of respectable size, and when Cæsar conquered Gaul the very trees we now gaze on were already older than almost any other tree now extant.

If we add to its other good qualities those of its ability to stand a very low temperature as well as a very high one, it may be seen that its advantages are indeed many, and that a better tree for memorial planting can hardly be had. But the nature of the *Sequoia gigantea* is little understood, and to this want of knowledge of its nature and the conditions under which it thrives must be laid the many reported failures in growing this tree, failures which are both frequent, alarming, and discouraging. Not one gardener in a million has ever seen the *Sequoia gigantea* in its native home in the Sierra Nevada, and few of those who have seen it have realized the peculiar conditions under which the tree thrives. That our Sequoia is a declining species can now be little doubted, notwithstanding the efforts and statements of several enthusiasts to the contrary. The Sequoia is a relic of the past, at least as far as California is concerned—a relic of a time when the climate was different from now, when it was moister and cooler than the one we now enjoy.

As is well known the *Sequoia gigantea* is found only in groves in the Sierra at altitudes varying from 4000 to 7000 feet, roughly speaking. The northern grove is the lowest, the southern grove the highest in elevation. This shows that a certain altitude is required, or rather that certain conditions attending altitudes are needed, for the welfare of the tree. These conditions of altitude can be only two—heat and moisture.

The further north the lower must be the altitude in order to supply the necessary heat; the further south again the higher must be the altitude in order to give the necessary moisture. That the tree in order to propagate itself successfully is greatly dependent on these two factors, may be inferred by a study of the various localities where it is found. It is not necessary to enumerate these here—they have been already commented upon in

a former paper in this periodical, and are now well known. But from the inspection of the various localities we can draw some conclusions of general interest. All the groves are protected from the north winds more or less, and all face the south and west. All groves grow where moisture is abundant, always around springs, creeks, ponds or meadows, or at least in places where moisture never fails. If we inspect a single grove we always find the largest, handsomest and healthiest tree near the water, at the edge of a meadow or stream. The further away from the water the drier the soil, the smaller and poorer are the trees. This is an invariable fact in every grove. In many instances the largest and finest trees circle around a beautiful meadow, crowding each other, where space is available, or towering singly where there is only ground enough for one. This is, for instance, the case with the "Meadow Maid," in the Bear Creek grove, one of the handsomest and most symmetrical of all the Sequoias. This tree grows on a low knoll, in the midst of a meadow which is always boggy and water-soaked.

Sequoia trunks and cones have been dug up out of many wells on the plains of the Sacramento and San Joaquin Valleys, indisputable proof that the tree in former ages extended to the plains. With the advent of a drier and warmer climate the trees retreated to the hills, higher in the south, lower in the north. At last they became isolated groves, finally, in some localities, isolated trees. Only in the southern groves do we find an abundance of young trees; in some of the northern groves we search in vain for any seedlings. What conclusion can we draw from this? That the *Sequoia gigantea* delights in rich and wet soil, in sheltered positions, and that it occurs in groves. The folly of planting this tree in dry, exposed places, singly or in rows, as is now done everywhere in this State, as well as in other parts of the United States and in Europe, is therefore evident. The greater the failure, the dryer the soil where the tree is planted. Lately I passed an avenue of Sequoias which were all dying out. The cause lay near at hand—dry soil, no artificial irrigation, no rain for six months, hard adobe soil, full exposure to winds, the trees planted in rows or singly. If these trees had been set in groups of a hundred on rich, moist land, where irrigation can be

resorted to in the summer, they would have protected themselves and they would have thrived. They would have been real memorial trees, which might yet be telling of themselves and of those who planted them, in the year 5893.

FIELD NOTES AT SAN EMIDIO.

BY ALICE EASTWOOD.

The ranch lies at the foot of the chain of hills which connects the Sierra Nevada Mountains and the Coast Range. It is watered by the San Emidio Creek, which diffuses itself over the surrounding country and, perhaps, in the spring, may be said to empty into Buena Vista Lake. It is further south than any other inhabited house in the San Joaquin Valley, and the winters are much milder than in adjacent parts of Kern County.

The flora of the lower hills and plains is the same as that which characterizes the San Joaquin Valley. This season was unusually late and unfavorable, for the cold rains retarded vegetation. In the hills especially was the delay apparent. It was the end of March ; but the twigs were only budding and the snow covered the side of San Emidio Mountain under the timber almost to its base.

Up on the low hills behind the ranch, the meadowlike summits were covered with flowers. The haze in the atmosphere threw a shadow of unreality over the distant Sierras, where the clouds hung low and the summits were white with the deep snow. Buena Vista Lake seemed so near. Not a tree hid its waters and only the shadows of low, barren hills rested on its bosom. It, too, seemed unreal—a phantom lake or a mirage in the enshrowding haze. The columns of dust that arose and slowly followed each other over the alkali desert were fit inhabitants of the weird scene.

These treeless uplands recalled the Alpine parks of the Rocky Mountains. Perhaps the green was not so deep, the flowers less abundant, and the species fewer in the same area. Certainly the coloring was not so rich and varied. The little streams that trickle from the snow-banks and gather volume as

they flow along were lacking; but the beauty was there, and the difference would be noticed only afterwards when the mind recalled former scenes. Then nothing could be more lovely.

The eye soon learns to distinguish the flowers, even at some distance, by means of the patches of color. "Alfilaria" is omnipresent, and where it monopolizes the soil a faint crimson tint prevails. Wherever the hills or plains are yellow over a considerable area, Baeria has crowded out all competitors. The bright yellow patches on steep hillsides, where there is little or no green, tell of Leptosyne. Glowing orange means Eschscholtzia; creamy white indicates "Creamcups" or Platystemon. Nemophila seems to have drawn bits of the sky to the earth here and there. Othocarpus adds vivid spots of deep crimson, and a peculiar white as of light chinchilla shows where *Gilia tricolor* carpets the ground. These are the most noticeable throughout the day; but at night almost all fold up their petals and go to sleep, and then when it looks as if the snow had suddenly fallen, *Gilia dichotoma* has awakened to keep the stars company.

Nemophila insignis, which everyone calls "Baby-Blue-Eyes," looks as innocent as its name. No one would guess what a struggle is going on within it. The pistils and stamens are at war and threaten to set up separate establishments. Here is one flower in which the pistil cowers down under the domineering stamens which rain down the pollen so that there can be no escape; but here is another blossom where the pistil proudly looks down upon the insignificant and completely subdued stamens. The buds show that the strife begins when the flower is born, and then it is that the supremacy of the male or female is decided.

Meconopsis heterophylla is the most conspicuous inhabitant of the flowery meadow, because of its brilliant color and comparative rarity. Sometimes a group of twenty or more will be seen, but more often they are fewer together or even solitary. The leaves are low down on the stem and therefore concealed by the other vegetation; the blossom is on a long, slender stalk and seems to be detached from the earth, and the bright red corolla deepening at the centre looks like a wavering flame hovering over the grass. It is fertilized in the bud.

Eschscholtzia Californica so glows with the sunbeams caught in its chalice that it diffuses light upon the other flowers and the grass. It will not shine unless the sun beams upon it but folds itself up and goes to sleep. It is fertilized in the bud.

Platystemon Californicus offers some unknown attraction to the bees. They ignore every other flower in their attentions to this creamy beauty. It, too, is fertilized in the bud. The petals and stamens persist until the pods are quite large.

Gilia tricolor, that most attractive little plant whose flowers the children call "Birds'-Eyes," has such a bright, cheerful look, such dainty coloring, so sweet a perfume, that none of the other blossoms can equal it in charm. When the light breezes pass over them they dance along the grass, look up so brightly and nod and smile. The flower is not fertilized in the bud but may be self-fertilized afterwards. The stigmas surpass the anthers, and when the blue pollen is being discharged the style branches are short and do not spread much. Later, they grow very long and curve around so as to meet the anthers.

At about four o'clock in the afternoon *Gilia dichotoma* begins to whiten the hillsides. Before expansion the flowers are hardly noticeable; the dull pink of the edges which are not covered in the convolute corolla hides their identity and makes the change, which takes place when they unveil their radiant faces to the setting sun, the more startling. They intend to watch all night and by sunset all are awake. In the morning they roll up their petals again when daylight comes on, and when the sun is well up all are asleep, tired out with the vigil of the night. The odor is most sickening. I watched them in the afternoon, at night, and in the early morning, and saw no insect approach. The stamens and pistil are deep down in the long tube of the corolla and it must generally be self-fertilized. The same flower opens several times and grows larger as it grows older.

Now, in the early morning, when *Gilia dichotoma* is about to retire, it is time for *Œnothera bistorta* to awaken and act as sentinel through the day. It is not fertilized in the bud, but self-fertilization is possible, though the style is longer than the stamens. As the style is deflexed towards the lower part of the flower which faces the sun and is not erect until mid-day, it can

easily be seen how the pollen of one flower can fall upon its stigma. It goes to sleep earlier than the other flowers and is more regular in its habits. They sleep during the cold and wet; but it always unfolds somewhat at the proper time, though not entirely unless the sun shines brightly.

Astragalus lentiginosus is the favorite flower of the bumble bees. Some plants were collected with pistillate flowers, the stamens being small, separate, and with what seemed abortive anthers. It certainly was a singular freak for an Astragalus, but the peculiarity was common on the late shoots of plants already heavy with fruit. Later it was seen that the change was due to a fungus.

Of course there were many other flowers but they were neither particularly admired nor closely observed. A list would necessarily omit so many prevailing later that it would be unfair to the locality and is better omitted.

A NEW COLLINSIA.

BY S. B. PARISH.

Collinsia Davidsonii. Span high, cymosely few-branched, glabrous: leaves inch long, entire obtuse, ovate or oblong, the lower pedicellate, the floral linear-spatulate: verticils few (3-8) flowered: pedicels shorter than the calyx, this three lines high, scarious at base, the thickened obtuse lobes green: corolla moderately oblique, its upper lobe pale blue, or nearly white, transversely callous, the ample lobes few-toothed; lower lip equaling the upper, its lateral lobes violet, the keel white with dark tip: filaments beardless: gland stipitate, line high: capsule oval, not surpassing the calyx lobes; ovules four in each cell, seeds rugose.

Collected by Dr. Anstruther Davidson on the Mojave Desert; at Lancaster, May, 1893. Types in the Gray Herbarium and in my own. A handsome little plant which I have much pleasure in dedicating to its discoverer.

NEW LOCALITIES FOR CALIFORNIA PLANTS.

BY T. S. BRANDEGEE.

In a region of such great extent as the State of California, so much of it yet wild and unvisited by botanists, we may hardly yet hope to have anything approaching a complete enumeration of the plants to be found within its borders. The distribution of the greater number of the species is, however, already approximately known, though fresh facts as they appear show us continually that the range of very many of them is much greater than has been supposed. The present paper is intended as a record of not only new forms, but of a very considerable number of extensions in range, some of them so unexpected and so far from previous stations as to be hardly credible without the evidence of the collector's specimens.

The data hereinafter given are largely drawn from collections made by Mr. William Vortriede in the Santa Lucia Mountains, in 1892, by Mr. L. Jared at Goodwin and Carisa Plain in the southeastern part of San Luis Obispo County from April to June of the present year, and by Miss Alice Eastwood, also in this year, in the mountains west and south of Bakersfield and west and north of Alcalde, and from the Mission of San Antonio through the coast mountains north to the Sur River. The names of other collectors are given after the stations of the plants collected by them. Where no name appears the collection has been in most cases made by the writer.

Myosurus minimus L. grows in very stout luxuriant form, the long receptacle often branching, about the marsh between Mt. Eden and Alvarado. It is nearly as abundant, but much more slender along the railway between Suisun and Vanden.

Delphinium nudicaule T. & G. Santa Lucia Mountains, *Eastwood, Vortriede.*

Isopyrum occidentale H. & A. Santa Lucia Mountains, *Vortriede*; Coburn Mills, Tulare County.

In the alpine region about Mt. Whitney there grows a yellow flowered Aquilegia, probably the one mentioned in the Botany of California as *A. cærulea.* It is common about Mt. Kaweah and there its yellow color often shades into red upon the spurs.

The lower the altitude at which it grows, the more the red appears. *Aquilegia truncata* with yellow centre and red spurs is abundant at lower elevations, and the higher the altitude the more yellow and the less red seems to be the rule, so that when following up a mountain brook a point was reached where it was difficult to distinguish the two species. This same alpine yellow columbine has been collected on other peaks near Mt. Whitney by Mr. Pixotto with the color on the spurs distinctly shading into blue. The scarlet flowered Eastern *A. Canadensis* has a yellow centre and is said in Gray's Manual to be rarely yellow all over, and a plant was found in Connecticut last year with entirely yellow flowers. A yellow-flowered Aquilegia grows near Manitou, Colorado, and specimens sent to Dr. Watson were named *A. cærulea.* These yellow-flowered specimens are noticed by Messrs. Meehan and Jones in Bot. Gazette iv, 248, and vi, 247, and the conclusion reached seemed to be that *A. cærulea* may have yellow flowers. These observations render the value of color uncertain in Aquilegia.

Actæa spicata var. *arguta* Torr. Coast south of the Sur, *Eastwood.*

Pæonia Brownii Dougl. Along the coast from Lower California to the Santa Lucia Mountains; Bartlett Mountain, Lake County.

Vancouveria hexandra Dec. Sur River, *Eastwood.*

Sireptanthus cordatus Nutt. Along the trail to Dana's, Santa Lucia Mountains, *Eastwood.*

Stanleya pinnatifida Nutt. Santa Maria Mountains west of Bakersfield, *Watts;* Goodwin, *Jared.*

Isomeris arborea Nutt. Mountains west of Bakersfield, *Eastwood;* Goodwin, *Jared.*

Oligomeris subulata Boiss. Mountains west of Bakersfield, Priest Valley, *Eastwood.*

Viola sarmentosa Dougl. Santa Lucia Mountains, *Vortriede;* Sur River, *Eastwood.*

Viola Sheltoni Torr. Grizzly Peak, Trinity County, *J. W. Blankinship*; Snow Mountain, Lake County.

Silene verecunda Wats. San Carlos, *Eastwood.*

Silene Palmeri Wats. Near Mansfield, Santa Lucia Mountains, *Eastwood.*

Arenaria congesta Nutt. Mineral King, 1892.

Polycarpon depressum Nutt. Mountains near Santa Barbara, May, 1888. Also on Santa Cruz and Santa Catalina Islands.

Lewisia rediviva Pursh. Cantua Mountain, and Jolon, *Eastwood;* Ukiah, *Mrs. M. E. P. McCowen;* Hough's Springs, Lake County; Mountains of Fresno.

Claytonia diffusa Nutt. Mill Valley Cañon.

Claytonia parvifolia Moç. Mill Valley near the waterfall; Lagunitas Creek; Kneeland, Humboldt County, *J. W. Blankinship.*

Sidalcea malachroides (H. & A.) Bixby Creek, Monterey County, *W. E. Bryant,* 1889; Slate's, Santa Lucia Mountains, *Eastwood;* Eureka, Humboldt County, *J. W. Blankinship,* June, 1893.

Claytonia saxosa. Annual acaulescent: leaves broadly spatulate, all radical: scapes numerous, stout 8-10 mm. long, bearing at summit two broad, foliaceous bracts and an umbel of 2-6 flowers on pedicels usually much exceeding the scape: sepals oblong-orbicular 3-4 mm. long, spatulate-obovate, pale rose color nearly twice the length of the sepals: capsule exceeding the sepals 3-ovuled, 1-3 seeded; seeds large, foveolate in lines; colyledons obliquely incumbent.

The plant though from an annual slenderly fusiform root bears considerable resemblance to *C. Megarrhiza.* It grows in dense succulent "balls" 1-3 inches in diameter on the shaly slopes of Snow Mountain, Lake County. Collected June 1891 and on Yolo Bolo in September 1892.

Linum digynum Gray. Sissons, *Dr. Palmer.*

Linum sperguliuum Gray. Warthen and Lewis Creek, *Eastwood.*

Erodium Texanum Gray. Frequent and variable in the hills west of Bakersfield, *Eastwood;* and common about Alcalde.

Oxalis Oregana Nutt. Santa Lucia Mountains, *Vortriede;* Sur River, *Eastwood.*

Flavkea proserpinacoides Willd. Lassen's Peak, June, 1883, *Mrs. R. M. Austin;* head of Squaw Valley, July, 1886, *C. F. Sonne;* Susanville, July, 1892.

Staphylea Bolanderi Gray. Near Sequoia Mills, July, 1892.

Lupinus cervinus Kell. Santa Lucia Mountains, the locality where the type was collected by Lobb, *Eastwood.*

Lupinus truncatus Nutt. Slate's Hot Springs, Santa Lucia Mountains, *Eastwood.*

Lupinus hirsutissimus Benth. Sur River, *Eastwood.*

Lupinus gracilis Agardh. Santa Lucia Mountains, *Vortriede.* The solitary specimen is a foot in height, the lower, remote axils bear solitary pedunculate pods, and above, after a leafy interval of six inches, the usual subverticillate raceme.

Hosackia crassifolia Benth. Santa Lucia Mountains, *Eastwood.*

Hosackia sericea Benth. Jolon, *Eastwood.*

Hosackia cytisoides Benth. Santa Lucia Mountains, *Eastwood;* also at Hearst's Ranch, San Simeon.

Hosackia grandiflora var. *anthylloides* Gray. Santa Lucia Mountains, *Eastwood;* Goodwin, *Jared;* also on Tamalpais.

Hosackia argophylla Gray. Santa Lucia Mountains, Sur River, *Eastwood.*

Trifolium longipes var. *latifolium* Hook. Upper Mad River, Trinity County, *J. W. Blankinship.*

Astragalus Purshii Dougl. Cantua Mountains, *Eastwood.*

Astragalus Spaldingii Gray. Honey Lake, July, 1892.

Psoralea California Wats. Mt. Hepsidam, *Eastwood;* Bartlett Mountain, Lake County and near Leesville, Colusa County, 1884.

Prunus emarginata Walp. Santa Lucia Mountains, *Eastwood.*

Prunus Andersoni Gray, which is so abundant about Reno,

Nevada, grows scattered through the Sage Brush nearly to Susanville, California.

Agrimonia Eupatoria L. Not uncommon in Napa and Lake Counties.

Carpenteria Californica Torr. The most accessible station now known for this plant is reached by way of the road running northwest from Fresno across Big Dry Creek to the saw mills on Pine Ridge. It covers a hill about a mile above Toll House in the immediate vicinity of the "Grapevine Spring," at which the teams to the mills stop for water. From this locality, discovered by Dr. Gustav Eisen, the seed of most of the plants in cultivation in Europe was obtained. Mr. W. A. Sanders, of Sanders, collected it later near the same place.

Jamesia Americana T. & G. is not mentioned in the Botany of California but is noted in the Botany of King's Report as occurring as far westward as the Wasatch Mountains at an elevation of 7000 feet. It has been found in the Huachuca Mountains of Arizona, a locality distant from the Rocky Mountains of Colorado and New Mexico, where it is very common. Dr. Kellogg, according to the labels attached to the specimens, collected it in Mendocino County. Last summer the writer found it growing among the rocks in the alpine regions of Mt. Kaweah. The bushes were very small, hardly becoming a foot high, dwarfed probably by the climate of the high altitude of the habitat, and instead of the usual white color the flowers were bright pink.

Whipplea modesta Torr. Santa Lucia Mountains, *Vortriede.*

Ribes Lobbii Gray. Shady cañons, Pacific Valley and Sur River, *Eastwood.* Fruit very large. As Lobb is known to have collected in the Santa Lucia Mountains, this is probably the locality of the type.

Eulobus Californicus Nutt. Huron and Alcalde, *Eastwood.*

Eucharidium Breweri Gray. Loma Prieta, and Mt. Hamilton, *W. W. Price,* June, 1890; Priest Valley, *Eastwood.*

Circæa Pacifica Asch. & Mag. Bridgeville, Humboldt County, *J. W. Blankinship.*

Mollugo verticillata L. Newcastle, Placer County, May, 1883.

Sesuvium Portulacastrum L. Buena Vista Lake, *Eastwood;* Tulare Lake, Pyramid Lake, Nev. and frequent about the San Joaquin River near Lathrop.

Cypselea humifusa Turp. Collected by Dr. Parry at Aptos, Santa Cruz County, July, 1883. Very abundant about late dried clay depressions near the San Joaquin Bridge.

Glinus Cambessidesii Fenzl., Ann. Wien Mus. i, 358. The plant so identified at Harvard was collected by C. C. Parry at Chico in 1882, and was found two years later near Folsom. Plants answering better to the description of *Glinus lotoides* L. Sp., 463, were collected at the San Joaquin Bridge near Lathrop, October, 1891, and at Lakeport in August, 1892. The stamens in all the forms are commonly five and the seeds minutely tuberculate in lines. Their nomenclature both under Glinus and Mollugo seems much confused.

Crantzia lineata Nutt. River banks Antioch; Roberts Island; pools near the railway between Port Costa and Martinez, June, 1891 and 1892.

Garrya Veatchii Kell. San Emidio Cañon and New Idria, *Eastwood.* The species is apparently much too near *G. Fremontii.*

Garrya elliptica Dougl. Santa Lucia Mountains, *Eastwood.*

Galium augustifolium Nutt. Alcalde and New Idria, *Eastwood;* Santa Lucia, *Vortriede.*

Pentachæta Lyoni Gray. Goodwin, *Jared.* An anomalous form with the glabrous involucre of *P. aurea,* but the akenes more hirsute than in typical *P. Lyoni,* the bristles of the pappus often more than twenty.

Bigelovia arborescens Gray. Santa Lucia Mountains, *Vortriede.*

Aster radulinus Gray. Santa Lucia Mountains, *Vortriede.*

Hymenoclea salsola T. & G. Goodwin, *Jared.*

Encelia Californica Nutt. Goodwin, *Jared.*

Helianthus invenustus Greene. Sequoia Mills, July, 1892. Stems numerous, eighteen to twenty-four inches in height, from a strong perennial root. A Balsamorhiza in habit, and no pappus found in any of the numerous plants examined.

Madia Nuttallii Gray. Santa Lucia Mountains, *Vortriede;* Sur River, *Eastwood.*

Madia radiata Kell. Alcalde, *Eastwood.* Abundant.

Lagophylla filipes H. & A. Rather widely spread through central and northern California. Guadalupe Mountain, Mariposa County, *J. W. Congdon;* San Antonio Creek, back of Mt. Hamilton, *Frank H. Vaslit;* New York Ravine, El Dorado County; Tamalpais beyond the second summit.

Whitneya dealbata Gray. Prattville, Plumas County, July, 1892; Sequoia Mills, Tulare County, in the same month.

Hulsea heterochroma Gray. Road to Dana's, Santa Lucia Mountains, *Eastwood;* Tule River.

Cacaliopsis Nardosmia Gray. Santa Lucia Mountains, *Vortriede;* Little Sur River.

Crocidium multicaule Hook. Goose Lake, *Mrs. Austin;* Mariposa, *J. W. Congdon.*

Arnica latifolia Bong. Mt. Hamilton, June, 1890, *W. W. Price;* Santa Lucia Mountains, *Vortriede.*

Phalacroseris Bolanderi Gray. Sequoia Mills, July, 1892.

Crepis occidentalis Nutt. Cantua Creek, *Eastwood.*

Picris Sprengeriana Lam. Dict. iv. 310. Ukiah, *Mrs. M. E. P. McCowen.* A waif from the Mediterranean Region.

Lactuca Scariola L. is becoming common about Lake and Upper Napa Counties and about the Sacramento River.

Campanula exigua Rattan. Bot. Gaz. xi, 339, (1886). Priest Valley, *Eastwood.*

Parishella Californica Gray. Goodwin, *Jared.*

Howellia limosa Gray. In ponds near Blocksburg, Humboldt County, *J. W. Blankinship,* June, 1893; previously known only from the Willamette River, Oregon.

Pleuricospora fimbriolata Gray. Mill Creek, near Healdsburg, *Miss Effie McIlriach.*

Trientalis Europæa var. *latifolia* (Hook.) Pacific Valley, *Eastwood.*

Cycladenia humilis Benth. Santa Lucia Peak, *Eastwood;*

Cobb Mountain, Lake County, *C. F. Leithold*, June, 1893; Snow Mountain, June, 1891.

Swertia perennis L. was collected at Mineral King, August, 1892, by Miss Faustina Butler.

Gilia Bigelovii Gray. New Idria, *Eastwood;* Tehachapi.

Gilia lutescens Stend. Common in the Santa Lucia Mountains, *Vortriede, Eastwood.*

Gilia Schottii Gray. Alcalde, *Eastwood.*

Hydrophyllum occidentale Gray. Mt. San Carlos, *Eastwood.*

Phacelia humilis T. & G. Hernandez and New Idria, *Eastwood.*

Phacelia circinatiformis Gray. Hite's Cove, Mariposa County, *Congdon;* Mt. Hamilton, *W. W. Price*, 1890.

Phacelia loasæfolia Torr. Common from San Simeon to the Sur River, *Eastwood, Vortriede.*

Phacelia grisea Gray. Santa Lucia Mountains, *Vortriede;* Little Sur River.

Phacelia Parryi Gray. Between King's City and Jolon, *Vortriede, Eastwood.*

Phacelia Fremonti. Huron, *Eastwood;* Alcalde.

Phacelia affinis Gray. San Carlos Mountain, *Eastwood.* A small form.

Lemmonia Californica Gray. Alcalde, *Eastwood;* Kernville, 1891.

Nama Parryi Gray. Goodwin, San Luis Obispo County, *Jared.* Leaves all entire.

Eritrichium Torreyi Gray. Buena Vista Hills, *Eastwood;* Alcalde.

Datura Stramonium L. Both the white and violet colored (*D. Tatula*) are abundant in Lake County, especially about Upper Lake. *D. Tatula* is not uncommon in Marin County; but *D. Stramonium* is the common form of the Sacramento Valley.

Verbascum Blattaria L. has long been abundant in California. It is found in the foothills above Sacramento; along the San

Joaquin, especially about Robert's Island; in Lake County, and even on Redwood Peak, back of Oakland. Specimens are also in the herbarium of the Academy of Sciences from Sisson, collected by Dr. Palmer, and from Big Meadows, collected by J. G. Lemmon, in 1880.

Collinsia Childii Parry. Santa Lucia Mountains, *Vortriede.*

Mimulus Palmeri Gray. Santa Lucia Mountains, *Vortriede;* Ben Lomond.

Mimulus Congdoni Wats. grows under the shade of Ceanothus bushes not far from the Lagunitas water-tank on the North Pacific Coast Railway. It much resembles *M. latifolius* Gray, of the islands off the coast of California and Mexico.

Mimulus Bolanderi Gray. Tehachapi; Santa Lucia Mountains, *Vortriede.*

Pentstemon Palmeri Gray. Lewis Creek and New Idria, *Eastwood.*

Veronica Buxbaumii Ten. Woodland, *J. W. Blankinship.*

Castilleia plagiotoma Gray. Alcalde, *Eastwood;* Goodwin, *Jared.*

Orthocarpus gracilis Benth. Santa Lucia Mountains, *Vortriede.* It seems not to have been collected since the time of Nuttall.

Aphyllon comosum (Hook.) is extraordinarily abundant in the low, overflowed lands between the San Joaquin and Paradise Cut about and beneath the railway trestle. It there blooms in August and September, both the plant and the flower unusually large, and from white through shades of lavender to purple. It seems there to be always parasitic on Grindelia.

Boschniakia strobilacea Gray has been brought from Willett's, Mendocino County, by Dr. Mary G. Campbell; and from Applegate in southern Oregon, by Mrs. H. S. Durden. It appears to grow always upon roots of Manzanita.

Utricularia vulgaris L. Blocksburg, Humboldt County, *J. W. Blankinship;* near San Joaquin Bridge; ponds near Olema.

Acanthomintha lanceolata Curran. Specimens of this plant obtained recently show that it is not nearly so widely separated

from *A. ilicifolia* as had been supposed, and it will not be surprising if fuller collections quite bridge the gap between them. Specimens collected by Jared, near Goodwin, have the upper lip of the pubescent corolla truncate, entire; middle lobe of the lower shortly two-lobed; anthers four, two-celled, not truly confluent, all woolly filaments nearly of equal length. A specimen collected by Lobb, at San Antonio, has the upper lip entire, middle lobe of the lower lip rather long and broadly spatulate; the four anthers woolly, nearly equal. A similar specimen collected by Mr. J. B. Hickman, somewhere in Monterey County, has the middle lobe of the lower lip narrower and the posterior anthers smaller on shorter filaments. Specimens by Miss Eastwood, from Priest Valley, have the upper lip of the glabrous corolla very shortly two-lobed, lobes of the lower lip nearly equal, the middle one linear somewhat pointed; anthers glabrous the posterior on much shorter filaments. Specimens from Warthen and Hernandez have pubescent corolla, both the upper lip and the somewhat obovate middle lobe of the lower lip emarginate; anthers somewhat woolly. Specimens from Mt. Hamilton, 1890, collected by W. W. Price, have the upper lip still more deeply lobed than the type, the lobes emarginate, middle lobe of the lower lip considerably longer than the lateral, emarginate and erose.

Monardella nana Gray. Santa Lucia Mountains, *Vortriede;* Little Sur, 1888.

Monardella Breweri Gray. Santa Lucia Mountains, *Vortriede, Eastwood.*

Audibertia humilis Benth. Santa Lucia Mountains, *Vortriede.*

Trichostema lanatum Benth. Santa Lucia Mountains, *Vortriede, Eastwood.*

Lamium amplexicaule L. Near Ione, May, 1886, and along the railway between Mt. Eden and Alvarado, June, 1893.

Melissa officinalis Tourn. (Common Balm.) San Rafael Water Works, *John McLean;* waysides, Santa Rosa; both in 1892.

Nepeta Cataria L. (Catnip.) Ager, July, 1887; Scott Valley, Lake County, abundantly in 1892.

Nepeta Glechoma Benth. Rather common about low lands in the Sacramento Valley.

Salvia Æthiopsis L. Established along the roadsides in Susanville, July, 1892.

Leonurus Cardiaca L. Oregon City. "Lobb."

Abronia villosa Wats. Alcalde, *Eastwood.*

Mirabilis lævis Benth. Pacific Valley, *Eastwood;* Alcalde.

Phytolacca decandra L., recently recorded from Los Angeles County, was observed by Frank H. Vaslit on Cow Mountain, in the northern part of Lake County, in 1885. It is very abundant along the California & Oregon Railway in the Siskiyou Mountains. Blue Lakes, Lake County, *J. W. Blankinship.*

Eriogonum inflatum Torr. Goodwin, *Jared.*

Eriogonum trichopodum Torr. Alcalde, *Eastwood.*

Chorizanthe perfoliata T. & G. Alcalde.

CHORIZANTHE VORTRIEDEI. Annual, reddish, prostrate, minutely glandular, but otherwise glabrous: leaves spatulate; bracts three-parted, shortly spinulose, small; nodes of the stem elongated: involucres 5 mm. long, quadrilateral, slightly saccate at base, shortly cleft into four equal lobes tipped with very short, erect spines, which are either straight or slightly hooked at tip: flowers long-pedicellate, two in each involucre; perianth exserted, lower half yellow, upper rose-color; segments deeply bilobed, the lobes lanceolate and somewhat spreading: stamens, nine.

The specimens are too young to admit of a description of the seed. In age they would probably be of considerable size, the spreading branches in some of the specimens having already attained a length of six inches or more. It is nearest *C. Thurberi* (Benth.) Collected in the Santa Lucia Mountains by William Vortriede in June, 1892, and by Miss Eastwood in June, 1893.

Chorizanthe Thurberi Watson. Alcalde, *Eastwood*, involucres, 8 mm. long.

Chorizanthe staticoides Benth. Alcalde, *Eastwood.*

Chorizanthe uniaristata T. & G. Alcalde, *Eastwood.*

Chorizanthe polygonoides T. & G. Antioch; Livermore; Laundry Farm near Oakland; Tamalpais.

Chorizanthe insignis Curran. Jolon, *Eastwood;* Santa Lucia Mountains, *Vortriede;* frequent in the range.

Eurotia lanata Moq. Goodwin, *Jared.*

Euphorbia hirtula Engelm. Nacimiento River, *Eastwood.*

Ephedra Nevadensis Wats. Hills west of Bakersfield, *Eastwood;* Goodwin, *Jared.*

Cephalanthera Oregana Reich. Santa Lucia Mountains, *Vortriede.*

Allium Parryi Wats. Mt. Hepsidam Range, *Eastwood.*

CHLOROGALUM PURPUREUM. Bulb ovoid, 2-3 cm. in diameter, membranously coated: stem ⅓-½ m. high paniculately branched: leaves rather narrow, linear, undulate: pedicel as long or longer than the perianth: perianth not vespertine, about 1 cm. in breadth, spreading from above the base; segments oblong-ovate with strong midnerve: stamens as long as the segments, spreading; filaments filiform purple: anthers yellow: style as long as the stamens, curved to the side: ovary sessile, ovules one in each cell.

A very handsome species, the numerous flowers purplish blue. Nearest *C. parviflorum.* Collected in the Santa Lucia Mountains in 1892, by William Vortriede; in 1893 in much better specimens by Miss Eastwood.

Chlorogalum angustifolium Kell. Mormon Island, Sacramento County; Tuolumne County near Big Oak Flat; between Ione and Carbondale; Round Valley, Mendocino County, *J. W. Blankinship.*

Fritillaria pluriflora Torr. Capay Valley, Yolo County, March 23, 1893, *J. W. Blankinship.* Seldom collected, flowers very handsome more than an inch long.

Odontostomum Hartwegi Torr. Near Napa, *A. W. Robinson*, 1892.

Prosartes Hookeri Torr. Santa Lucia Mountains, *Vortriede.*

Clintonia uniflora Kunth. Sequoia Mills.

Clintonia Andrewsiana Torr. Santa Lucia Mountains, *Vortriede, Eastwood.*

Lysichiton Kamtschatcensis Schott. Santa Cruz Mountains near Boulder Creek, *W. G. Farlow.*

Nitella clavata var. *inflata.* In Echo Lake, Santa Catalina Island, May, 1890.

ADDITIONS TO THE FLORA OF SOUTHERN CALIFORNIA.

BY S. B. PARISH.

Since the completion of the Botany of the Geological Survey a considerable number of plants have been detected which were not then known to grow within the limits of the State, and the range of others has been found to be much more extensive than is indicated in that work. Probably these additions and extensions have been more numerous in the southern counties than elsewhere. Owing to the premature discontinuance of the survey the botanical exploration of these counties was less thorough than in the upper part of the State, which then contained a far larger proportion of the total population than at present. With a single notable exception the South was also entirely without local botanists, Mr. Daniel Cleveland having been for years the only resident cultivator of the science. It was not until near the completion of the second volume that a few records are made based on the collections made by Rev. J. C. Nevin and Mr. W. G. Wright, and the explorations of Parry and Lemmon. Since then the knowledge of the southern flora has been greatly enlarged by others who have become residents of the region, among whom may be mentioned Mr. W. S. Lyon, Mr. C. R. Orcutt, Dr. H. E. Hasse, Dr. A. Davidson and Prof. A. J. McClatchie.

This botanical activity has resulted in the discovery of a number of new species, and the extension to this region of others.

Some of these extensions have been noted in the last volume of the Synoptical Flora, or in recent monographs and other papers. A considerable number, however, remain as yet unrecorded, and some of the more interesting of these are given in the following list, which makes no pretense to completeness, and, indeed, might easily be considerably enlarged. The place of publication is cited for these species not enumerated in the Botany of the Survey, and these are additions to the flora of the State, as well as to that of Southern California. The others extend the range of more northern plants not heretofore recorded from the southern counties. With the exception of a few rare species none of those are included whose previously known range was south of the latitude of San Francisco.

Phytographically these northern plants belong to the Sierra Nevadan flora, and they form most of the additions to the vegetation of our higher mountains. The Sonoran flora of the arid regions to the east, Nevada, Arizona, Utah, has supplied the additional desert plants, and some of those which climb the desert flanks of the mountains. The stations for the first class are in many cases the southern limit of the species, and those for the second class the western or northern limit. Some exceptional plants will be noticed by the reader. All stations recorded are authenticated by specimens in the herbarium of the writer, and when no other collector's name is cited his is to be understood.

Myosurus apetalus Gay, Fl. Chil. i, 31. Borders of lake, Bear Valley, in San Bernardino Mountains, altitude 6000 to 7000 feet.

Ranunculus Eschscholtzii Schlecht. Anamad. Ranunc. ii, 16. Summit of Grayback Mountains, altitude 11,725 feet, *W. G. Wright.*

Ranunculus alismæfolius Geyer, var. *alismellus*, Gray. Tauquitz Meadows, San Jacinto Mountains, *Dr. H. E. Hasse.*

Arabis Ludoviciana C. A. Meyer, Ind. Sem. Petr. ix, 60. San Diego, *D. Cleveland.*

Caulanthus procerus Wats. Northern slope of San Bernardino Mountains, at about 6000 feet altitude, Bear Valley road.

Nasturtium sphærocarpum Gray, Pl. Fendl. 6. Mouth of Santa Ana Cañon, San Bernardino Mountains.

Cleomella oöcarpa Gray. Rabbit Springs, Mojave Desert.

Viola blanda Willd. Not uncommon about cold springs in the San Bernardino Mountains, at from 5000 to 7000 feet altitude.

Viola chrysantha Hook. Common in moist sands from Bear Valley to head of Cañon Diablo, San Bernardino Mountains.

Silene Menziesii Hook. Stream banks, Bear Valley.

Stellaria borealis Bigelow. Cold bogs, Bear Valley.

Sagina occidentalis Wats. Streets of Los Angeles, *Hasse;* hillsides, Santa Monica, *Davidson;* Santa Catalina Island, *Lyon.*

Sagina Linnæi Presl. Cold bog, near Bear Valley dam.

Lewisia rediviva Pursh. Bear Valley; San Antonio Peak.

Lewisia brachycalyx Engelm. Meadows, Bear Valley.

Bergia Texana Seub. Inlet of Elsinore Lake, Riverside County.

Horsfordia Newberryi Gray, Proc. Am. Acad. xxii, 297. *Abutilon Newberryi* Wats. Bot. Calif. i, 87. Rocky ravines at Toros, on the Colorado Desert.

Linum micranthum Gray. Newhall, *Davidson.*

Ayenia pusilla L. Cañons at Agua Caliente (Palm Springs), Colorado Desert.

Geranium cæspitosum James, Long's Exp. ii, 3. Bear Valley, *Parish;* Tauquitz Valley, *Hasse.*

Condalia spathulata Gray, Pl. Wr. i, 32. Mountains of the Colorado Desert near Mesquite Station, *W. F. Parish.*

Glossopetalon spinescens Gray, Pl. Wr. ii, 29, t. 12. Northern slope of San Bernardino Mountains, near Cushenberry Springs.

Acer glabrum Torr. Headwaters of Mill Creek, San Bernardino Mountains.

Psoralia castorea Wats. Proc. Am. Acad. xiv, 291. Sand hills at Camp Cady, Mojave Desert.

Astragalus Preusii Gray, Proc. Am. Acad. vi, 222. Sand hills at Dos Palmos, Colorado Desert.

Hoffmanseggia stricta Benth. in Gray, Pl. Wr. i, 56, ii, 50. Gravelly plains at San Felipe, Colorado Desert.

Hoffmanseggia microphylla Torr. Mex. Bound. 50. Dry washes of the Colorado Desert; Toros; Indian Wells; Agua Caliente.

Calliandra eriophylla Benth., Lond. Jour. Bot. iii, 105. Colorado Desert near Mesquite Station, *W. F. Parish.*

Ivesia santolinoides Gray. Holcomb Valley, San Bernardino Mountains, at 7500 feet altitude.

Tellima tenella Walp. Bear Valley, San Bernardino Mountains.

Ribes cereum Dougl. Bear Valley, *Parish;* Tauquitz Valley, *Hasse, Parish.*

Sedum spathulifolium Hook. Big Meadows, San Bernardino Mountains, *Wright.*

Cotyledon Nevadensis Wats. Common on southern slope of San Bernardino Mountains, at from 2000 to 4000 feet altitude.

Lythrum Hyssopifolia L. Sp. Pl. 447. River bed at San Diego, *Cleveland.*

Œnothera Palmeri Wats. Proc. Am. Acad. xii, 251. Mojave Desert, from Antelope Valley to Rabbit Springs, *Davidson, Hasse, Parish.*

Mentzelia congesta T. & G. Mojave Desert, probably near Rock Creek.

Mentzelia Wrightii Gray, Pl. Fendl. 48. Mammoth Tank, Colorado Desert, *W. F. Parish.*

Petalonyx nitidus Watson, Am. Nat. vii, 300. Cushenberry Springs.

Symphoricarpos orcophilus Gray. San Bernardino Mountains, at about 6000 feet altitude; Bear Valley; Mill Creek Falls.

Peucedanum villosum Nutt. Acton, *Hasse.*

Galium Rothrockii Gray, Proc. Am. Acad. xvii, 203. Syn. Fl. I, ii, 39. Colorado Desert, probably at Mountain Springs.

Galium stellatum Kellogg, Proc. Calif. Acad. ii, 77. Crevices of dry cliffs, Agua Caliente.

Brickellia atractyloides Gray, Proc. Am. Acad. viii, 290. Crevices of cliffs; Vallecito; Agua Caliente; Cushenberry Cañon.

Aplopappus lanceolatus T. & G. Fl. ii, 241. Meadows at Bear Valley and Holcomb Valley.

Antenaria alpina Gærtn. Summit of Grayback Mountain, *Wright.*

Hemizonella Durandi Gray. Common in the San Bernardino Mountains, at from 4000 to 5000 feet altitude.

Senecio eurycephalus T. & G. Dry ridges at summit of Tejon Pass. Insufficient specimens from Wilson's Peak, *Davidson*, may belong here.

Microseris Douglasii Gray. Meadows at Elizabeth Lake.

Downingia pulchella Torr. Cuyamaca Mountains.

Bryanthus Breweri Gray. Big Meadows in the San Bernardino Mountains, *Wright.*

Chimaphila Menziesii Spreng. Mill Creek Falls, San Bernardino Mountains.

Pyrola picta Smith. Near the summit of San Antonio Peak.

Pterospora andromedea Nutt. Common in open pine forests in the San Bernardino and San Jacinto Mountains, at from 4000 to 8000 feet altitude.

Forestiera Neo-Mexicana Gray, Proc. Am. Acad. iv, 304. Mojave Desert; Lancaster, *Davidson;* Rock Springs; Rabbit Springs, *Parish.*

Amsonia tomentosa Torr. Fremont's Rept. 2d Ed. 316, Cactus Station, Cushenberry Cañon.

Astephanus Utahensis Engelm. Am. Nat. ix, 349. Gravelly plains, San Felipe.

Gentiana simplex Gray. Little Bear Valley, San Bernardino Mountains.

Gentiana Amarella Linn. var. *acuta* Hook. f. Bear Valley.

Gilia Bigelovii Gray, Proc. Am. Acad. viii, 265. Morongo Pass.

Gilia Breweri Gray. Bear Valley.

Gilia latifolia Wats. Am. Nat. ix, 347. Warm Springs on the Mojave Desert.

Phacelia Lemmoni Gray, Syn. Fl. II, i, 417. *P. heterosperma*, Parish, Bot. Gaz. xiii, 37. Rock Creek, Mojave Desert.

Triardia Watsoni Torr. Agua Caliente, *Davidson, Parish.* Abundant near Cushenberry Springs.

Nama stenocarpum Gray, Proc. Am. Acad. x, 331. Santa Monica, *Hasse.*

Nama Rothrockii Gray. Holcomb Valley.

Coldenia canescens DC., Prod. ix, 559. Mesquite Cañon, Colorado Desert, *W. F. Parish.*

Harpagonella Palmeri Gray. Mesas near San Diego, *Parry.*

Krynitzkia leucophæa Gray. Abundant near Cushenberry Springs.

Cuscuta obtusifolia HBK. var. *glandulosa* Engelm. Trans. St. Louis Acad. i, 492. On Polygonum, San Bernardino.

Cuscuta denticulata Engelm. Cushenberry Springs.

Pentstemon breviflorus Lindl. Lancaster, *Davidson.*

Pentstemon Eatoni Gray. Cushenberry Cañon.

Pentstemon pumilus Nutt., var. *incanus* Gray, Syn. Fl. II, i, 259. Aguanga, San Jacinto Mountains.

Pentstemon ambiguus Torr. Ann. Lyc. N. Y. ii, 228. San Felipe.

Pentstemon Bridgesii Gray. Mill Creek Falls.

Veronica alpina L. San Jacinto Mountains.

Utricularia vulgaris L. Bear Valley.

Martynia altheæfolia Benth., Bot. Sulph. 38. Valiecito.

Lippia lanceolata Mich. Fl. ii, 15. Los Angeles, *Hasse;* San Bernardino.

Sphaccle calycina Benth. var. *Wallacei* Gray. Wilson's Peak, *Davidson.*

Boerhavia viscosa Lag. Andrea's Cañon, near Agua Caliente.

Abronia nana Wats. Proc. Am. Acad. xiv, 294. Bear Valley.

Polygonum emersum Britt., Trans. N. Y. Acad. Sci. viii, 73; Small, l. c. 359. San Diego, *Cleveland.*

Polygonum incarnatum Ell. Sk. i, 456, Small, l. c. 358. Los Angeles, *Davidson.*

Eriogonum Parryi Gray, Proc. Am. Acad. x, 77. Mojave Desert, Warm Springs.

Eriogonum Kennedyi Porter. Bear Valley, near Beardstown.

Eriogonum microthecum Nutt. Bear Valley.

Eriogonum Plumatella Dur. and Hilg. Mojave Desert; Rabbit Springs, etc.

Oxytheca Watsoni T. & G. Near Cushenberry Springs.

Euphorbia eriantha Benth. Agua Caliente, *Davidson, Parish.*

Callitriche marginata Torr. Santa Monica, *Hasse.*

Callitriche verna L. Julian; Bear Valley; Little Bear Valley.

Myrica Californica Cham. Santa Monica, *Hasse, Lyon.*

Salix cordata Muhl., var. *Watsoni* Bebb. Bear Valley.

Salix flavescens Nutt. Bear Valley Toll Road, *Parish;* Grayback Mountain, *Wright.*

Arceuthobium divaricatum Engelm. On *Pinus monophylla,* Cushenberry Cañon; Cox's Ranch.

Lilium pardalinum Kellogg. San Bernardino, *Wright.*

Calochortus clavatus Wats. Los Angeles, *Davidson.*

Calochortus flexuosus Wats. Am. Nat. vii, 303. Rev. Lil. 266. Cushenberry and Rabbit Springs.

Potamogeton fluitans Roth. *P. lonchites* Tuckerm. Near Colton.

Potamogeton natans L. Bear Valley.

Potamogeton pectinatus L. Elsinore Lake, *McClatchie, Parish;* Los Angeles, *Nevin;* San Bernardino; Bear Valley.

Sagittaria calycina Engelm., Gray's Man. 5th Ed. 492. Coyote Creek, near Anaheim.

Juncus Leseurii Bolander. Waterman's Cañon, near San Bernardino; Fallbrook.

Juncus obtusatus Engelm. Little Bear Valley.

Juncus Mertensianus Meyer. Head of Mill Creek.

Carex straminea Schk., var. *mixta* Bailey, Proc. Am. Acad. xxii, 151. Waterman's Cañon.

Carex Deweyana Schw., var. *Bolanderi* W. Boott. Mill Creek Falls.

Carex festiva Dewey. Bear Valley.

Andropogon macrourus Mich. Foothills near San Bernardino.

Alopecurus geniculatus L., var. *aristulatus* Munro. Bear Valley.

Stipa occidentalis Thurb. Mill Creek Falls.

Muhlenbergia Texana Thurb. Coult. Man. Rocky Mountain Bot. 410. Vallecito.

Sporobolus gracillimus Scrib. Grayback Mountain, *Wright.*

Agrostis scabra Willd. Bear Valley.

Deschampsia calycina Presl. San Gabriel, *Hasse;* Bear Valley.

Triodia pulchella HBK. Mesquite Cañon, *W. F. Parish.*

Poa Bigelovii V. & S. Agua Caliente, *Davidson.*

Glyceria nervata Trin. Little Bear Valley.

Equisetum lævigatum Al. Br. Common at San Bernardino.

Cryptogramme acrostichoides R. Br. Big Meadows, *Wright.*

Woodsia Oregana Eaton. Grayback Mountain, *Wright;* Lower Holcomb Valley, *W. F. Parish.*

ROMNEYA COULTERI Harv. Mrs. Ida M. Blochman, of Santa Maria, has recently obtained this plant on the Cuyama or Santa Maria River, "growing right on the river looking across into San Luis Obispo County." It has not yet been reported nearly so far north.

SIERRA NEVADA PLANTS IN THE COAST RANGE.

BY KATHARINE BRANDEGEE.

The great valley of California is a basin or plain irregularly elliptical in shape and about five hundred miles in length by one hundred in breadth. It is rimmed all around with mountains, the only opening being that from which all the waters of the basin escape to the sea. The northern half of the valley, drained by the Sacramento and its tributaries, is called the Sacramento Valley; the southern half, drained by the river of that name, is called the Valley of the San Joaquin. The slope of the land is to the centre, where the two rivers meet and pour their mingled waters into the Bay of San Francisco. The rim of the valley is highest where the Sierra Nevada makes its eastern wall, even the Truckee Pass, where the Central Pacific Railroad crosses it, being over seven thousand feet in altitude. The southern wall, formed by the Tehachapi Range, is nearly four thousand feet in its lowest passes; the northern, formed by the Shasta Range is but little less, and the western, though lower, is double, with a long valley or series of valleys intervening, the inner, at least in the northern half, having many peaks of considerable altitude, Yolo Bolo being over eight thousand feet, Sanhedrim, Hull and Snow Mountain between six and seven thousand.

Seeds transported by whatever agency must find suitable conditions or they will not thrive, and to this fact, of course, we owe the diversity of flora still existing. The broad hot valley of California offers no suitable home for the plants of the Sierra and they cannot cross it. The valley plants cannot endure the cold of the mountains, and if they flourish for a season even their seeds succumb to the winter frosts.

It is perhaps from a consideration of the barrier interposed by this valley that the flora of the Sierra Nevada has been considered to be so different from that of the Coast Range that surprise is often expressed at the finding of additional species common to both. It is, however, easily understood that plants may follow the valley wall in any direction and for a distance limited only by comparative height and consequent degree of heat.

The localities of plants should be observed and recorded at

the earliest possible date. Man brings with him so many disturbing elements that a few years may almost change the face of nature. Of these disturbing factors, one of the greatest is a flock of sheep. Not only does it destroy or render very scarce many of the native plants, but in California, where sheep are kept on the public domain, they are fed in the spring months on the foothills, are driven to the high mountains as the season advances, and back as the snow threatens, to the stubble fields and tule marshes of the lowlands. In these peregrinations they distribute in varying proportion the seeds of many of the plants growing in the regions passed over. There is scarcely a spot except upon the highest peaks, where sheep have not penetrated and altered to some extent the character of the flora.

The railway lines are another potent factor in the disturbance of distribution, the construction trains, which transport rock and earth for embankments, offering special facilities for the wandering of species, but their action being more definite and much more recent, is in most cases readily understood and causes no confusion, as for instance in the invasion of the San Joaquin Valley by the plants of the Mojave Desert now in active progress.

The species enumerated below are in most cases additions to the known flora of the Coast Range or have their range much extended southward. It does not comprise all the additions collected, the grasses, Cyperaceæ, etc., being neglected, and even of the other orders a considerable number have escaped reckoning on account of the distribution of the plants in the herbarium, no list having been made, and only those included which could be recalled from memory and readily verified. The greater part of them were obtained from Snow Mountain in Lake County in two visits; one made by Mr. Brandegee in June, 1891; the second by the writer late in August, 1892.

Snow Mountain is in Lake County and nearly due north a little more than a hundred miles from San Francisco. It rises to a height of nearly 7000 feet, and the depth of the winter snow and the degree of cold is apparently quite as great as at the summit of the Donner Pass in the central Sierra Nevada. The plants are still insufficiently known, the top being covered with snow

drifts at the date of the earlier visit, while at the later one the sheep had nearly finished all that were to their taste. No one lives on the upper part of the mountain, but there are remains of old cabins at the summit meadows, where the shepherd pitches his tent for the late summer when the flocks are driven up from the lower slopes. In the clear cold streams which run down its gorges to join the south fork of the Eel River, trout abound and deer are a common sight, and venison is familiar food to the visitor.

The landscape forcibly reminds of the Sierra Nevada. The small lakes and boggy meadows are bordered by Veratrum and alpine asters, and spangled with white violets and the primrose mimulus all hoary with dew-entangled hairs. The upper slopes and dry valleys are covered with forests of white cedar, fir and "Jeffrey's pine," surrounded by thickets of the bitter cherry (*Prunus emarginata*) and the "snowbush" (*Ceanothus cordulatus*), while the peaks and ridges and the dry uplands of the meadows are brightened by the scarlet *Gilia aggregata*, the well-known "pussy's paws" (*Spraguea umbellata*), the brilliant yellow *Eriogonum umbellatum*, the broad tufts of purple and white *E. ovalifolium*, and the fluffy rose-colored balls of the most beautiful of all the species, *E. Lobbii*.

A few additions to the coast flora were made by Mr. Brandegee in a visit of a single day, late in September, to the Yolo Bolo.* The mountain had been at that date so ravaged by sheep, that no food whatever remained for the horses, and the trip was brought to an untimely conclusion.

Mr. C. F. Leithold, a student of the Stanford University, made in June of the present year a collection of the plants of Cobb Mountain, in Lake County, a few miles north of Mt. St. Helena. Its flora is almost the same as that of the neighboring mountain, but *Abies concolor* is found upon it.

The general level of Lake County is of considerable altitude, Clear Lake which occupies its centre being about 1500 feet, so that the elevation of the mountains above the level of the sea is a good deal greater than their apparent height. Bartlett

* Called on the maps "Yallo Ballo," but pronounced as above by the people of the vicinity.

Mountain which rises steeply from the northeastern shore of the lake is about 4000 feet altitude. Mt. Hanna, often called "Bottle Glass Mountain" from the quantity of obsidian found upon it, is some distance away from the lower end of the Lake, on the western side, and its elevation is considerably less. The plants of the Sierra Nevada found on these mountain tops differ somewhat, in most cases, from those of the original locality, a difference easily to be explained by their isolation and difference of the soil. Micromorphic botanists may indeed insist that the differences between these plants found on the massive granite of the Sierras and those on the many-colored shales of Snow Mountain are sufficient to constitute species.

Ranunculus alismæfolius var. *alismellus* Gray. Borders of meadows, Snow Mountain, June.

Argemone hispida Gray. Summits of Snow Mountain, evidently brought there by the sheep.

Arabis platysperma Gray. Snow Mountain.

Vesicaria montana Gray. Snow Mountain.

Viola blanda Willd. Meadows, Snow Mountain.

Viola aurea var. *venosa* Wats. Snow Mountain, June.

Viola Sheltoni Torr. Snow Mountain, June.

Polygala cornuta Kell. Proc. Cal. Acad. i, 61. *P. Californica* of Bot. Cal. Snow Mountain.

Silene Menziesii Hook. Snow Mountain.

Arenaria verna L. var. *hirta* Wats. High rocky ridges, Snow Mountain; Yolo Bolo.

Claytonia Chamissonis Esch. Cold bogs and streamlets, Snow Mountain.

Spraguea umbellata Torr. Snow Mountain.

Sidalcea Oregana Nutt. Snow Mountain. The Sierra Nevada form.

Ceanothus prostratus Benth. On Mt. St. Helena in the form described as *C. divergens* Parry. On Cobb and Snow Mountains quite as prostrate as in the Sierra Nevada.

Ceanothus velutinus Dougl. From Mt. St. Helena, where it

grows abundantly a short distance back of the Toll House, northward, but not seen on Snow Mountain.

Ceanothus cordulatus Kell. A prevailing shrub in the thickets near the top of Snow Mountain.

Lupinus laxiflorus Dougl. Snow Mountain.

Trifolium cyathiferum Lindl. Snow Mountain; also collected by Mr. J. W. Blankinship in Big Valley, Lake County.

Hosackia stipularis Benth. Cobb Mountain. An exceedingly glandular form. Collected by C. F. Leithold.

Psoralea Californica Wats. seems hardly distinct from *P. esculentus*. It is common enough about elevations of 3–5000 feet in Lake County, and has been collected by the writer on Mt. Diablo, by S. B. Parish on the San Bernardino Mountains, by Miss Eastwood on the peaks west of Alcalde, and near Kernville by Mr. Brandegee.

Astragalus Purshii Dougl. Snow Mountain; Yolo Bolo.

Prunus emarginata Walp. Abundant, forming tangled thickets, in the summit valley of Snow Mountain.

Rubus leucodermis Dougl. Snow Mountain. Common.

Purshia tridentata DC. Slopes of Snow Mountain at 5000 to 6000 feet.

Cercocarpus ledifolius Nutt. Covering a spur of Snow Mountain, not far from the Coast Survey monument. The gnarled trunks twelve to eighteen inches in thickness.

Potentilla gracilis Dougl. Snow Mountain. Common in high meadows.

Horkelia tridentata Torr. Snow Mountain.

Ivesia Gordoni T. & G. Near the monument, Snow Mountain.

Saxifraga peltata Torr. Snow Mountain, streams of the lower part.

Ribes Lobbii Gray. Snow Mountain. Equally abundant with *R. Menziesii* Pursh. The fruit is so strongly glandular as to be scarcely fit for any use.

Sedum obtusatum Gray. Snow Mountain.

Gayophytum ramosissimum T. &. G. Snow Mountain. Common.

Gayophytum pumilum Watson. Snow Mountain and common about Lake County.

Megarrhiza muricata Wats. Common in Lake County and in Colusa County not far from Leesville. The fruit usually 8-seeded.

Galium Bolanderi Gray. Snow Mountain; Yolo Bolo.

Galium multiflorum Kell. In crevices of rocks, Snow Mountain; Yolo Bolo.

Eupatorium occidentale Hook. Streams about the base of Snow Mountain.

Brickellia Greenei Gray. Snow Mountain; Yolo Bolo. Flowering in August and September.

Aplopappus apargioides Gray. Snow Mountain.

Aplopappus Greenei Gray. Snow Mountain; Yolo Bolo. August.

Bigelovia graveolens Gray. Shasta Plains; Sissons; Yolo Bolo; Snow Mountain; Bartlett Mountain; Mt. Hanna. Flowering at the end of August.

Aster Shastensis Gray. Snow Mountain; Yolo Bolo.

Aster adscendens Lindl. Snow Mountain.

Antennaria luzuloides var. *argentea* Gray. Snow Mountain; Elk Mountain.

Antennaria Geyeri Gray. Yolo Bolo.

Hemizonella Durandi Gray. Bartlett Mountain; Snow Mountain.

Chaenactis Douglasii H. & A. Snow Mountain.

Arnica foliosa Nutt. Very abundant along streams and covering a long slope near the monument on Snow Mountain.

Raillardella Muirii Gray, var. Abundant on rocky slopes near the monument on Snow Mountain. It was just coming well into bloom on the twenty-fifth of August.

Crepis intermedia Gray. Snow Mountain.

Crepis occidentalis var. *crinita* Gray. Snow Mountain.

Crepis occidentalis var. *Nevadensis* Kell. Cobb Mountain, *C. F. Leithold.*

Arctostaphylos Nevadensis Gray. Snow Mountain.

Pyrola picta Smith. Common on Snow Mountain.

Pyrola rotundifolia L. Cobb Mountain, Lake County, *C. F. Leithold.*

Pyrola aphylla Smith. Often collected on Tamalpais, and frequent through Lake County, northward.

Pterospora andromedea Nutt. Snow Mountain.

Cycladenia humilis Benth. Common and abundant on the higher slopes of Snow Mountain.

Schizonotus purpurascens Gray. This species is widespread and abundant on Snow Mountain, flowering in June and ripening its fruit in September.

Frasera nitida Benth. Cobb Mountain, *C. F. Leithold;* Mt. Hanna; Snow Mountain.

Frasera speciosa Dougl. Yolo Bolo.

Phlox Douglasii? Yolo Bolo. Past flower and fruit.

Collomia tenella Gray. Snow Mountain. Common.

Gilia pungens Benth. Crevices of rocks, Snow Mountain.

Gilia aggregata Spreng. Snow Mountain.

Gilia Harknessii Curran. Common about the borders of meadows, Snow Mountain.

Gilia capillaris Kell. Allen's Springs; Hot Springs, Eel River and very abundant all about Snow Mountain; Mt. Sanhedrim, *J. W. Blankinship;* Hy-Am-Pum, *W. W. Price;* taller and less diffuse at the lower elevations.

Collinsia Torreyi Gray. Snow Mountain. Common.

Pentstemon Menziesii Hook. Snow Mountain; Yolo Bolo; Cobb Mountain; Mt. St. Helena.

Mimulus rubellus Gray. Snow Mountain. Common.

Mimulus primuloides Benth. Wet meadows, Snow Mountain.

Castilleia linariæfolia Benth. Snow Mountain; Yolo Bolo.

Castilleia miniata Dougl. Pubescent form. Cobb Mountain, *C. F. Leithold;* Snow Mountain; Yolo Bolo.

Cordylanthus Pringlei Gray. Lower slopes of Snow Mountain. Flowering in August and September.

Pedicularis semibarbata Gray. Bartlett Mountain; Snow Mountain.

Monardella odoratissima Benth. Snow Mountain.

Lophanthus urticifolius Benth. Snow Mountain. Growing in thickets of Ceanothus, Ribes, etc., the purplish heads surmounting them.

Polygonum Bistorta L. Meadows and banks of streamlets, Snow Mountain.

Polygonum Davisiæ Brewer. High rocky peaks, Snow Mountain.

Eriogonum umbellatum Torr. High rocky ridges, Snow Mountain; Yolo Bolo.

Eriogonum compositum Dougl. Snow Mountain; Yolo Bolo.

Eriogonum Lobbii T. & G. High rocky ridges near the monument, Snow Mountain. Flowers forming larger heads and of deeper rose-color than those seen in the Sierra Nevada.

Eriogonum ovalifolium Nutt. Abundant and forming dense tufts often a foot in diameter, the snowy mass of small leaves surmounted by short peduncles, bearing heads of whitish flowers which become at length rose-colored. Snow Mountain.

Eriogonum spergulinum Gray. Snow Mountain. Common about the borders of meadows.

Eriogonum hirtiflorum Gray. Common in Lake County. Dwarf at high elevations, but about Hough's Springs and on the lower slopes of Snow Mountain reaching so great a size that a single individual would fill several sheets of collecting paper.

Quercus chrysolepis Liebm. on Snow Mountain reaches an elevation of about 4000 feet, above that level dwarfing rapidly into its subalpine form, var. *vaccinifolia.* The ascent of the mountain is so abrupt that the phases of transition can be readily followed.

Taxus brevifolia Nutt. Deep cañons of Elk Mountain and on Snow Mountain.

Abies concolor Lindl. Snow Mountain, from 4500 to 6000 feet, also on Cobb Mountain, where it was collected by Mr. C. F. Leithold.

Abies nobilis Lindl. The most abundant tree of Snow Mountain above the altitude of 6000 feet.

Pinus Sabiniana Dougl. reaches about 3800 feet on Snow Mountain.

Pinus ponderosa var. *Jeffreyi* Gray is found on Snow Mountain from 5000 feet upward.

Pinus Balfouriana Jeffrey. Yolo Bolo.

Pinus Lambertiana Dougl. was found on Snow Mountain at greater elevation than any other pine, but in the higher altitudes the trees were dwarfed and distorted.

Veratrum Californicum Durand was abundant in the meadows of Snow Mountain.

Smilax Californica Gray. Yolo Bolo.

RANDOM BIRD-NOTES FROM MERCED BIG TREES AND YOSEMITE VALLEY.

BY W. OTTO EMERSON.

I found on arriving at the South Grove of Merced Big Trees some interesting birds peculiar to the higher altitude of the Sierra in summer. I spent June 17 and 18, 1893, in that section of the Merced Grove. I found it a slight hollow or flat of some four or five acres in extent where are eighteen or twenty trees of *Sequoia gigantea* scattered through the forest of sugar pines, yellow pines, cedars and firs.

The work of the pileated woodpecker (*Ceophlœus pileatus*) can be seen here and there spotted over the thick bark of the Sequoia. Many of the holes were six to eight inches across and ranging all the way from ten to thirty feet from the ground. I saw only one of these large woodpeckers as it flew through the trees.

I saw three of the white-headed woodpecker (*Xenopicus albolarvatus*). In the dead top of a pine stump some fourteen feet from the ground was a nest of a pair of these birds. After rapping on the stump I could hear the young squeakers calling for their parents. I watched the old birds for an hour or more collecting insects from the bark of the different evergreens to feed the ever hungry young ones. They always began at the lower part of the tree and gradually worked upward, zig-zagging around the tree to the top, then flying downward to the base of another tree. It would take at least half an hour before seeming to have enough insects to carry to the young. I supposed the birds to be gathering ants and larvæ of bark insects. It was the delight of one of this pair of woodpeckers to fly to a certain fir tree and have a pair of Louisiana tanagers (*Piranga ludoviciana*) chase it around the tree. I have no doubt but that the tanagers had a nest in the tree. While camped in the grove I saw five of these tanagers.

I noticed only two of the red-breasted sapsucker (*Sphyrapicus ruber*). One I watched every morning from my tent fly to the top of a tall burnt tree and rap its roll-call as a kind of warning may be to the flying insects. It would then sail out like a flycatcher, catch an insect, and return to the burnt tree-top. Its movements were very graceful and regular. As it dipped or circled around for this or that insect the sunlight catching on the red breast lit it up like a patch of flame.

The Californian woodpecker (*Melanerpes formicivorus bairdi*) was not uncommon. Harris' woodpecker (*Dryobates villosus harrissii*) was the only other species of Picidæ noted in the grove besides the red-shafted flicker (*Colaptes cafer*).

The blue-fronted jay (*Cyanocitta stelleri frontalis*) was twice seen, but was very shy and quiet, no doubt nesting.

The California purple finch (*Carpodacus purpureus californicus*) was observed several times, but had not paired off.

Juncos (*Junco hyemalis thurberi*) were in pairs, but not common.

One thick-billed sparrow (*Passerella iliaca megarhyncha*) was noted, seeming to have only arrived, as I found them common later above the Yosemite Valley.

Two spurred towhees (*Pipilo maculatus megalonyx*) were seen.

That most beautiful swallow, the violet-green, (*Tachycineta thalassina*) was seen to pass one morning on its way to the oak flats.

Audubon's warbler (*Dendroica auduboni*) was seen on one occasion passing hurriedly through the trees.

A male black-throated gray warbler was seen feeding amongst low bushes early one morning.

I saw four of the beautiful hermit warblers (*Dendroica occidentalis*); all were feeding in low bushes along the mountain streams.

The California creeper (*Certhia familiaris occidentalis*) was observed several times running up and down first one tree and then another. All were busy hunting food for young.

The slender-billed nuthatch (*Sitta carolinensis aculeata*) was seen but once.

I saw one Townsend's solitaire (*Myadestes townsendii*) the day we arrived in camp at the grove. I collected a specimen at Haywards some ten or twelve years ago, the only one I have heard of being taken so near the Coast.

A ruby-crowned wren (*Regulus calendula*) was observed feeding in a fir tree.

The notes of small thrushes (*Turdus*) were heard several times, but the birds being so shy, I could not get a glimpse of them.

The following birds were observed from June 20th to 25th in the Yosemite Valley. It is a garden spot on a grand scale for bird life. I think that the valley is one of the best spots in California to spend a season, collecting. Here are found trees and shrubs of the white, black and chestnut oaks, yellow, silver and sugar pines, red cedar, Douglas fir, willows, cottonwood and alders, manzanita, chemise, chaparral, wax-berry, deer-brush, wild rose, California azalea, wild coffee, dog-wood, mountain mahogany, wild cherry, currant and gooseberry.

Killdeer (*Ægialitis vocifera*) were seen along the Merced River banks.

The day we entered the valley, June 19th, a bevy of downy

young of the plumed partridge (*Oreortyx pictus plumiferus*) with the old ones ran across the road and scattered among the leaves. Every morning in my walks before sunrise I would see the partridges dusting themselves in the road. I noticed none of the California partridge while in the valley. A young lady of our party caught two downy young of the sooty grouse (*Dendragapus obscurus fuliginosus*) on the trail going to Nevada Falls June 21st. The old birds would not respond to the peeping of the young and venture from the bushes and the young were allowed to go.

Mourning dove (*Zenaidura macroura*) was seen but once.

A Cooper's hawk (*Accipiter cooperi*) was seen sailing among the firs and pines on Glacier top, at an altitude of 3300 feet.

A golden eagle (*Aquila chrysaëtos*) appeared once high above the Yosemite Falls to let us know that Eagle Point above our camp was named for him.

Belted kingfishers (*Ceryle alcyon*) were observed along the river.

Four species of woodpeckers were seen in the valley, Harris', white-headed, Californian and red-shafted flicker.

The peculiar, lonely notes of a California poor-will (*Phalænoptilus nuttalli californicus*) could be heard nights high up on the cliffs above the valley.

The black swift (*Cypseloides niger*) is very common high up in all the cliffs, particularly the face of Glacier Point. I have sat on the rocks of the trail leading up to the point and had them sail close over my head and could see them below me moving back and forth about the face of the cliff.

Associated with the black swifts were several of the white-throated (*Aëronautes melanoleucus.*)

The only humming-bird observed in the valley was the calliope (*Trochilus calliope*). One came within eighteen inches of my feet to the flowers of a milk-weed. I often noticed them about the young fir tops where they may build their nests. I have a male specimen which was shot in my orchard at Haywards from a flowering peach tree, March, 1880.

Ash-throated flycatchers (*Myiarchus cinerascens*) were several times seen in the oak trees near our camp and along the fences in the meadows.

Western flycatcher (*Empidonax difficilis*) was observed but once along the bushy banks of the Merced River.

I heard the notes of the olive-sided flycatcher (*Contopus borealis*) on several occasions in the high tree tops along the high trails of the valley.

The western wood pewee (*Contopus richardsonii*) was not uncommon, usually in pairs. A nest was being built in an oak near my tent.

Blue fronted jays were tolerably common in the deep forests and cañons, preferring the cedars and firs.

Clarke's nutcracker (*Picicorvus columbianus*) was seen on two occasions, once on Sentinel Dome, 8122 feet altitude.

A single female blackbird (Agelaius) was twice seen flying across the meadow by the river, and a western meadow-lark (*Sturnella magna neglecta*) was noticed in the same locality.

Bullock's orioles (*Icterus bullocki*) were seen in the oaks near camp.

Brewer's blackbird (*Scolecophagus cyanocephalus*) was nesting in trees near the lower hotel.

In the forenoon of June 25th, while camping near the old saw mills not far from Mr. Hutchings' cabin, a pair of evening grosbeaks (*Coccothraustes vespertinus montanus*) came to our table, placed beside a white oak, to pick up crumbs for their young. They were not afraid of anyone in camp.

The purple finches also came to camp every day for food.

Western chipping sparrows (*Spizella socialis arizonæ*) were noted several times about camp. I think they had young in an old apple orchard near by.

Juncos were met with only in the deep forests of pines, cedars, and firs, and were not paired as far as I could judge.

A variety of song sparrow was not fully identified. Mr. Shelley Denton collected specimens there in 1881, which I am sure were *Melospiza fasciata montana.*

Lincoln's Sparrow (*Melospiza lincolni*) was seen in the meadow.

Thick-billed sparrows were seen several times. I sat by the trail to Glacier Point where it passes through a stretch of manzanita to hear the song of this species. It is a loud, clear, whistling

note, much like the notes of the purple finch. After singing several notes they would dive into the brush like the wren-tit.

Spurred towhees were not uncommon all through the valley, and the green-tailed towhee (*Pipilo chlorurus*) were seen about bushes near camp. Mr. Denton collected a number of them in his visit here in 1881.

The black-headed grosbeak (*Habia melanocephala*) was very common all through the valley. They came into camp in pairs and helped themselves from the table, not seeming afraid of anyone; no doubt had young near by. The males were on good terms with each other, eating from the same piece. They repaid us by singing from the tree tops at first light of day and last at night.

Lazuli bunting (*Passerina amœna*) was not common in the valley and only seen about orchards. Louisiana tanagers were common all through the thickest forests, preferring the tall firs. I heard no notes from them and they did not appear to have paired off.

The notes of the western purple martin (*Progne subis hesperia*) were heard in some old oaks near the Stoneman House, like the old farm-place of my eastern home. At two camping-places in the foothills I noticed young martins.

Violet-green swallows were seen in company with the two species of swifts high up on the Glacier Point trail. They no doubt nest in the cliffs as very few trees were suitable on the wall ledges.

The only vireo observed in the valley was the warbling (*Vireo gilvus*).

Lutescent warblers (*Helminthophila celata lutescens*) were not common and only twice observed along the river banks in thick brush.

Andubon's hermit and yellow warblers were seen but once during my short stay.

A pair of Macgillivray's warblers (*Geothlypis macgillivrayi*) were seen in thick azaleas near the river and acted as though they had a nest near the spot.

American dipper (*Cinclus mexicanus*). The first bird to greet me on getting into the valley was this water spirit, at the foot of

Cascade Falls where it comes leaping and rolling off the granite boulders to the river, the ideal home of the dipper.

The California creeper was seen on two occasions on cedar trees.

Slender-billed nuthatches were seen in white oaks once, but no individuals of *Sitta canadensis*.

The mountain chickadee (*Parus gambeli*) was seen on one occasion while passing through a mass of firs at summit of Glacier Point. The surrounding conditions were such that I expected to find it a common bird.

The whistling notes of a pallid wren-tit (*Chamæa fasciata henshawi*) were heard in a manzanita thicket half way up to Glacier Point.

A ruby-crowned wren was seen in a young fir tree near our camp at Bridal Veil Fall.

Townsend's solitaire was twice seen and a specimen taken at Diamond Cascades below the Vernal Falls.

The jewel of all the high Sierra singers is the western robin (*Merula migratoria propinqua*). It perches at the top of a pine or fir and sings till the setting sun is down, breaking forth now and then with a few notes till night begins. At first break of morning light, about three o'clock, his song is in greatest perfection; after greeting the day he is then quiet excepting a short low bar of love to his nesting mate. Full-grown young with spotted plumage were about our camp all the time.

BOTANICAL NOMENCLATURE.

BY KATHARINE BRANDEGEE.

It must be confessed that the present state of nomenclature is hardly an encouragement to those attempting to reform it. Almost every author of a systematic treatise has a system of his own, differing more or less from that of his neighbor, and in too many cases his meaning can only be made out by the average botanist through the quoted "synonymy." This state of things not only furnishes the "biological" botanist with his keenest weapons against systematic work but lessens to a marked degree

the interest felt in the science by the large body of botanists, who not being in command of extensive libraries find themselves unable to judge between the conflicting claims of the various new names, with which those familiar to them are to be supplanted.

The rigid law of priority, judging by what its attempted enforcement has produced, is not competent to give us a stable nomenclature. There are too many cases which under such a rule must always remain in doubt, and it is further complicated by questions of sufficiency of publication, and the right to amend names which open vistas of perpetual argument. It must be apparent too that the claim of strict justice which is supposed to underlie the law of priority is a delusion. It puts the work of the most ignorant and incompetent on a level with that of the greatest scientest, offering a direct premium for hasty and inconsiderate work, and yet no permanent advantage can accrue to the vain glory of anyone, for it is only a question of time and settled nomenclature when author-citation will be discontinued in systematic, as it now is in popular and semi-scientific work.

It would seem that there should be some limit to the raking up of obscure and forgotten species and genera, especially as they were in the great majority of cases neglected for good reason, and have in many instances become recognizable only by the advance of knowledge or by a process of exclusion. A law of limitation has been found necessary in the property affairs of mankind, and such a law with a period of—say fifty years—might give us relief from that class of "scientists" whose researches into the mysteries of nature consist in trying to find out what our predecessors knew, instead of doing their little best to add to the world's knowledge.

A tendency to legislate for one's neighbors is usually found in indirect ratio to fitness for such an office. No code of laws yet exists which is able to provide for all occasions, and the more minutely rules are drawn, the greater is the list of exceptions. The citing of publications, for instance, may safely be left to the example of those who remember in their works, that the saving of labor to others is the object of citation, and the question of the

initial letters of species will settle itself in time into a matter of convenience, there being no real rule of grammar involved—the Romans as every one knows had only one kind of letters—all capitals.

Rules relating to the formation of systematic names had perhaps better be only recommendatory. The aspect of the purist in the language of science is one of the most ridiculous things the world has encountered. The Latin of modern science would at its best be a foreign language to Cicero, and the attempt to exclude names not formed according to the best models is especially characteristic of those who, having rather late in life acquired a "little Latin and less Greek," are painfully anxious to advertise the fact.

JOHN LORA CURTIS.

John Lora Curtis, the young California araneologist, who died in Oakland on February 19, 1893, was a life-long invalid. He was confined to a wheel-chair for thirteen years, more than half of his short life. He was so weak that even a book was too large a burden for his hands. Yet he was a better student and lover of nature than many stronger men. His education was necessarily desultory. He began his study of spiders in his sixteenth year, and did his collecting of specimens mostly at second hand, through friends and correspondents. In this way he collected and preserved more than two hundred species of spiders, almost altogether from California. He estimated that, at a reasonably low figure, fifty of these were new to science.

Lack of funds kept his library small, and he had not been able to secure such works on American spiders as Keyserling's, therefore he was very diffident about offering to publish for new what might prove to be species already described. Had his life been spared only a few years longer he surely would have added new forms to the list of described spiders of California. As it is, it remains the duty of some arachnologist to work over the specimens left by him with their accompanying notes.

Just a few days before his death he had the pleasure of reading the proof of his first (and last) published article: *A New*

Jumping Spider, in Zoe, vol. iii, p. 332. He had previously prepared an article on a species of *Theridion*, of about fifteen or twenty ordinary octavo pages, illustrated with over fifty figures, mostly colored, and finished with great care. This contains, beside the description of the little spider, its life history thro' two generations, each represented by many individuals, noting at least six fairly distinct varieties. The publication of this article has been delayed by the difficulty in reproducing the colored plates.

Rev. Henry C. McCook, the distinguished araneologist of Philadelphia, in writing of Mr. Curtis says: "A little while before I had prepared material for a new species of spider which I had dedicated to him, attaching to it his name. The drawings of this are done, and the engraving of *Pachygnatha Curtisi* is already upon the plate of the lithographer."

His interest in spiders was united to a lively interest in other branches of natural history and social progress. His aim was to prepare a descriptive list of the spiders of California. When he foresaw his early death he hoped some stronger hand would continue and finish the work. J. D. L.

A NEW STATION FOR ASPLENIUM SEPTENTRIONALE. Mr. Brandegee sends specimens from San Pedro Martir, a high mountain nearly east of San Quintin, in Baja California. This is five or six hundred miles west of the nearest previously recorded station, which is, I think a mountain in New Mexico, called Ben Moore, where Dr. J. M. Bigelow detected it in 1851. Mr. Charles Wright collected it probably at the same place a little later. Next, Hall & Harbour found it in Colorado, and Mr. Brandegee obtained it later in the Grand Cañon of the Arkansas.

In the Old World its range is from Great Britain to the Himalaya Mountains. It is strange it has never been found in the eastern part of North America. D. C. EATON.

RECENT LITERATURE.

A Jumping Mouse (Zapus insignis Miller), new to the United States. By GERRIT S. MILLER, JR. Proc. Biol. Soc. Wash., viii, April 22, 1893, 1–8. This species described by Mr. Miller in Am. Nat. xxv, August, 1891, 472, from New Brunswick, has since been collected in New Hampshire and New York.

Description of a New White-footed Mouse from the Eastern United States. By GERRIT S. MILLER, JR. Proc. Biol. Soc. Wash., viii, June 20, 1893, 55-69. *Sitomys americanus canadensis.*

List of Mammals Collected by Mr. Charles P. Rowley, in the San Juan Region of Colorado, New Mexico, and Utah, with Descriptions of New Species. By J. A. ALLEN. Bull. Am. Mus. Nat. Hist., v, April 28, 1893, 69-84. Thirty-four species are enumerated with annotations and critical notes. The following are described as new: *Zapus princeps* from Florida, La Plata County, Colorado; *Arvicola (Mynomes) aztecus* from Aztec, New Mexico; *Sitomys auripectus* from Bluff City, Utah; *Sitomys rowleyi* from Nolan's Ranch, Utah; *Reithrodontomys aztecus* from La Plata, New Mexico.

Introduction to a Monograph of the North American Bats. Notes on the Genera of Vespertilionidæ. By HARRISON ALLEN, M. D. Proc. U. S. Nat. Mus., xvi, pages 1-31.

Rediscovery of the Mexican Kangaroo Rat, Dipodomys phillipsi Gray. By C. HART MERRIAM, M. D. With Field Notes by E. W. NELSON. Proc. Biol. Soc. Wash., viii, July 18, 1893, 83-96. A series of 67 specimens from the Valley of Mexico, after the species had been known but from a single specimen for fifty-two years.

Systematic and Alphabetic Index to New Species of North American Phanerogams and Pteridophytes, Published in 1892. By JOSEPHINE A. CLARK.

This index is one of the most useful publications of the National Herbarium. It is, however, marred by a very serious fault. Instead of being an index of new species, it is in very large part an index of changes of nomenclature, and there are

furnished no means of determining to which of these classes any given name belongs. For instance, Miss Vail is credited with a list of species of Meibomia, only one of which was described by her, and none at the place cited; and McMillan is credited with six species of Pleurolobus. Only the comparatively small number of botanists who concern themselves with changes in nomenclature are likely to remember that these are but familiar species of Desmodium, many of them described by Linnæus. Professor Greene is credited with fifteen new species of Blepharipappus, which are only renamed Layias, and twenty-four species of Linanthus, all but one of them long-described and well-known Gilias. In like case are all the new species of Platystemon, Bicuculla, Caprifolium, Jacksonia, Lesquerella, Nasturtium, Stellularia, Hesperalcea, Kuhnistera, Kunzia, Lutkea, Therofon, Stellaria, Arracacia, Myrrhis, Symphoricarpus, Caprifolium, Ereminula, Lappula, Kœllia, Tullia, Salvia, Ramona, Mirabilis, Neckeria, Razoumofskya, Manihot, Scoria, Ostrya, Leptorchis, Corallorhiza, Gyrostachys, etc., etc. In a number of instances the same species—even those considered the same by their author—is listed twice, as in the case of *Fritillaria coccinea* & *Fritillaria recurva coccinea*, *Callichroa nutans* & *Blepharipappus nutans*, *Plagiobothrys Californicus* & *P. campestris*. These serious errors are so easily remediable by the use of different type or by double citation that we hope to see the next list free from them.

Additions to the Phanogamic Flora of Mexico. By B. L. ROBINSON and H. E. SEATON, being No. 3 of the New Series of Contributions from the Gray Herbarium of Harvard University. In it twenty-nine new species and several varieties are described.

In the *Torrey Club Bulletin* for July, Dr. Britton has been doing useful work in looking up the authenticity of some of Rafinesque's genera recently attempted to be revived. *Pseva*, which Dr. Kuntze has taken as the older name of *Chimaphila*, in which action he was precipitately followed by Professor Greene, is shown to have no foundation. It rests upon Rafinesque's statement, published in the Journal de Physique, 1819, that "*Chimaphila* Pursh is antedated by *Pseva*, Raf. Med.

Rep. 1809." Dr. Britton says: "I wish to record here that I have recently gone over these papers line by line, and can find no allusion to *Pseva* in any of them, nor have I met with the name in any of Rafinesque's writings except at the place where he claims it as noted above." The attempt to resurrect an earlier name for *Polanisia* is disposed of as follows: "*Jacksonia*, Raf. Med. Rep. (II) v, 352 (1808). Professor Greene has argued in Pittonia ii, 174 and 274 that this name should replace *Polanisia* Raf. Journ. Phys. lxxxix, 98 (1819) but I cannot see that his position is tenable. *Jacksonia* is published at the place above cited as follows:

Jacksonia (trifoliata)=*Cleome dodecandra* L. Now *Cleome dadecandra*, L. Sp. Rl. 672 is a well-known Indian species. Rafinesque evidently followed Michaux in supposing that it was North American, and *Cleome dodecandra* Mich. Fl. Bor. Amer. ii, 32, 1803, is indubitably the same as *Polanisia graveolens* Raf. Amer. Journ. Sci. i, 379 (1819) and not at all the plant of Linnæus. In matters of nomenclature we must be exact and so it seems to me that *Jacksonia* Raf. can only apply to the Asiatic, Linnæan, *Cleome dodecandra*. I do not find any allusion to Jacksonia in subsequent writings of Rafinesque, and presume that he discovered his error." In the meantime, however, Professor Greene has made haste to transfer* the species of *Polanisia* to *Jacksonia* and under the head of "Corrections in Nomenclature" †to transfer the three dozen species of the Australian, Leguminous genus *Jacksonia* to another name.

The Range of Amorpha fruticosa. By JOHN M. HOLZINGER of the U. S. National Herbarium. Under this heading Mr. Holzinger prints in Erythea for June some notes on specimens belonging to the U. S. National Herbarium which show that the range of the species is considerably farther extended than had been supposed. In the course of his examinations he found that the three sheets of this group belonging to Professor Greene's herbarium, two of them labeled *A. Californica* Nutt. and one *A. hispidula* Greene, were in his opinion incorrectly named. Concerning them he wrote: "There seems to have existed a long

* Pitt. ii, 174.

† Erythea, 114.

standing confusion of *Amorpha fruticosa* with *A. Californica* in the region of Arizona, New Mexico and Southern California that must have led Professor Greene to describe Nuttall's true *Amorpha Californica* as a new species, *A. hispidula.*" Professor Greene seems to have become somewhat enraged, and in an appended note bristling with remarks concerning Mr. Holzinger's "dogmatism," "bald opinions," "entirely gratuitous suppositions," etc., gives the luckless botanist who has presumed to differ from him, a sound verbal spanking. Nevertheless Mr. Holzinger is entirely correct as everyone at all conversant with the flora of California knows, and Mr. Greene as entirely wrong. Indeed his descriptions of *A. Californica* and *A. hispidula* in Flora Franciscana convict him sufficiently. In the brief description there given he omits from the former, apparently intentionally, for as it appears in all descriptions he can hardly have been ignorant of it, Nuttall's significant phrase "petioles furnished with minute glandular scales." At the risk of being accused of "dogmatism" I venture to state that *A. fruticosa* enters Southern California where it has been collected not only by Dr. Palmer, but also by George W. Dunn who found it in the mountains near Julian something like forty miles north of the boundary. It grows also about the lower elevations of San Pedro Martir in Baja California, which is perhaps its southern limit. The range of *A. Californica* as at present known is from the southern border of Mendocino County along the Coast Range in various localities to San Pedro Martir, where it has recently been found on the summit plateau. In the Sierra Nevada foothills it appears to have been collected only at the Alabaster Cave not far from Auburn. The only habitat known for *A. hispidula* is the mind of Professor Greene.

Fourth Annual Report of the Missouri Botanical Garden contains, besides the usual Reports, etc., a list of plants collected by Albert S. Hitchcock in the Bahamas, Jamaica, and Grand Cayman, 132 pages, and four plates of the new species, *Pavonia Bahamensis* Hitchcock, *Anastraphia pauciflosculosa* Wright, *Euphorbia Blodgettii* Engelm., and *Eragrostis Bahamensis* Hitchcock. The remainder of the volume is occupied by "Further Studies of Yuccas and their Pollination" by William Trelease.

Professor Trelease adopts, in accordance with Mr. Baker's views, the name, "Hesperoyucca" for *Yucca Whipplei*, which he separates as a generic type. The article is accompanied by many excellent plates.

North American Sileneæ and Polycarpeæ. By B. L. ROBINSON. Being the fifth of the new series of Contributions from the Gray Herbarium. This tentative revision is preliminary to treatment of the Caryophyllaceæ in the Synoptical Flora and its object is stated to be "chiefly to secure aid through criticisms, and to call attention to such species, especially in the genera *Silene* and *Lychnis* as are still imperfectly known, so that if possible more complete material of them may be secured before final revision." The author evidently doubts the validity of certain accepted species of Silene and his remarks upon the distortion of the flowers of the type of *Silene Lyalli* by a well-known fungus are very suggestive. One new species of Lychnis, *L. Tayloræ*, and two of Silene, *S. Watsoni* (changed from *Lychnis Californica*) and *S. scaposa* are proposed. *S. simulans* is reduced to *S. laciniata*, *S. incompta* to *S. Bridgesii*, *S. plicata* to *S. Thurberi*, *S. Shockleyi* to *S. montana*, *S. Macounii* & *S. monantha* to varieties of *S. Douglasii; S. purpurea* is admitted "but not seen by the author." With the treatment of Lœflingia we do not agree and hope that fuller material will convince the author that there are not three American species. The appearance of a revision of the remaining genera is awaited with much interest, and from Dr. Robinson's opportunities and well-known conscientiousness in research it cannot fail to be valuable.

Contributions from the Herbarium of Columbia College, No. 35. An Enumeration of the Plants collected by Dr. Thomas Morong in Paraguay, 1888-1890. By THOMAS MORONG and N. L. BRITTON, with the assistance of MISS ANNA MURRAY VAIL. Reprinted from Annals of the New York Academy of Sciences vol. vii. The paper is of much consequence to the flora of South America. It has the interest which always attaches to botanical papers where the author has been at once collector and writer.

Forest Influences—Bulletin No. 7 of the Forestry Division, U.

S. Department of Agriculture. This is a series of papers by B. E. Fernow, M. W. Harrington, Cleveland Abbe, and G. E. Curtiss, on a subject of great economic importance.

Grasses of the Pacific Slope, Part ii, being Bulletin No. 13 of the Department of Agriculture, Division of Botany. This part, issued after the death of Dr. Vasey, contains fifty plates with descriptions, titles, and index and completes the volume. It is a welcome addition to the literature of the Grasses.

Erythea for July contains some new species of Californian Fungi by J. B. Ellis and B. M. Everhart; an account of A New Station for *Notholæna tenera* by S. B. Parish; Remarks on the Genoa Congress by Dr. Otto Kunze, and under the title "Novitates Occidentales" the usual new species, of the customary value, by Professor Greene.

A Dictionary of Botanical Terms: A. A. CROZIER. Henry Holt & Co., New York 1892.

The progress in the study of natural sciences during the later years has very considerably extended our points of view in many directions. In botany, for instance, investigations in morphology, anatomy and physiology have been carried out to such an extent as to make the introduction of new terms necessary, while many of the terms formerly used have been dropped. This introduction of new terms and change of older ones has caused considerable trouble to both authors and students.

It is, therefore, very natural that a terminology thoroughly brought up to date would be welcomed all the world over, since a work of that kind would be both an assistance and guide to our reading and would enforce uniformity in using the terms as generally adopted. A work of that kind, it seems to us, should only be the product of careful literary research made by several specialists in their respective lines, in order to give a reliable result. We, therefore, felt very much surprised to see a book of this scope written by a single author. A mere look in the book soon convinced us that a very large number of terms had been compiled, and so far the book is of some use.

But since this book will undoubtedly enter the libraries of our

universities and colleges, we feel the more at liberty to discuss in how far it is to be recommended as a suitable dictionary for the study of botany.

It appears, only too clearly upon careful examination, that the author of the present work has not possessed full knowledge of any of the many botanical lines which were supposed to be represented by modern or old terms in this book.

The literary part of the work has not been done carefully, and the definitions of the various terms are very poor, and absolutely incorrect in many cases. What we hoped to find was not only an explanation of the words themselves, when taken from foreign languages, their derivation for instance, but also their true signification in botany, as they have been or are still applied by different authors. But in this respect the book does not give much information, indeed it seems as if the whole subject has been treated more like a mere compilation without criticism rather than representing the result of literary research and original investigation.

It is very unsafe to quote terms from a single article without trying to find out by original and confirmatory investigations what it really means. Instead of finding a uniformity in terms, as applied for instance to a series of homologous organs, we find often great confusion. In many cases the terms themselves are not correctly defined, besides a number of quite common ones are entirely overlooked.

By considering the morphological terms it is striking to see, that the most essential points are often not given, and it seems necessary to give a few citations:

"Cotyledon" is said to be "the first leaf or leaves of a plant;" we wonder if this also applies to *Cryptogames?*

"Nut" is defined as being "the fruit of certain trees and shrubs, consisting of a hard shell enclosing the seed." The principal characteristic, that a nut is indehiscent, is omitted.

"Nutlet" is "a small nut, or nutlike seed or fruit as many achenia." We doubt whether it has ever been applied to seeds.

"Paraphyses" are defined as "sterile filaments," while a filament is defined as "the stalk of an anther."

"Utriculus" is referred to "utricle" as being "a fruit with

inflated, membranous pericarp;" the very well-known utriculus of *Carex* is not mentioned and is not to be compared with such a kind of utricle.

About "drupe" is only said that "it occurs in peach, almond, and cherry, being characterized by having a bony endocarp;" nothing is said about the fleshy exocarp.

"Nectary" is, according to this dictionary, only "the part of a flower which secretes nectar." The common extra floral nectaries are silently passed by, and this is the more curious when we see under "gland," "also applied to certain wart-like swellings which are not secretory, [sic] as the abortive teeth at the base of the leaf of peach and cherry"! These glands are certainly secretory, however. "Secretory" is not defined.

"Scape" is defined as "a peduncle rising from the ground, as in Sanguinaria, *i. e.*, a stalk from the root." The author has probably never seen the large rootstock of this common plant.

"Palet" of the grasses is defined as "the inner bract or chaff." This organ is, nevertheless, wanting in several genera; then the flowering glume would be the same as the palet, a terminology which is untenable. The singular position of this organ, the palet, with its back towards the mother-axis, seems entirely unknown to the author.

If we turn to the anatomical and physiological terms, we find these still more defective, and it is often utterly impossible to draw any correct conclusion from the definitions of the various tissues, when compared with each other. "Cuticle" is said to be "the outer cell-wall of the epidermis;" "Leptome," which is credited to Potonié, is attributed to "vascular Cryptogames only," and "Hadrome," also credited to Potonié, and defined as "the phloëm-like portion of fibro-vascular bundles in vascular Cryptogames." These two terms, leptome and hadrome, would then be identical, while in reality hadrome is used instead of the term xylem. Under "Phloëm" we are told that "the inner bark is derived from the phloëm and the wood from the xylem." Haberlandt was the first to introduce these terms, not Potonié. The author ought to have studied Haberlandt's Physiologische Pflanzen-anatomie—he would then have been spared much trouble, besides would have been able to define these terms correctly.

In the definitions of Mestome, Stereome, Pericambium, and Endodermis, so plainly described by Schwendener, De Bary and other authors, it is surprising to find such confusion as occurs in this book. Mestome-sheath and Parenchyma-sheath are not defined at all, although the preface promises us very many terms from German botanists. Cells as ducts or reservoirs are represented only by "Laticiferous-vessels, *i. e.*, anastomosing tubes." De Bary's comparative anatomy would have been a great help to the author, and would have shown him that far from all of these are anastomosing. Reservoir is not defined, not even the common tannin reservoirs.

When these common terms are so badly treated, what can be expected in regard to the more complicated ones?

We merely need to look for the definition of "Chlamydospore" about which we learn that "they are formed asexually in Mucorini by free-cell formation." The words "transpiration" and "respiration" are so defined as to render it evident that the author is entirely ignorant of even elementary physiology.

In regard to recent cytological terms the book shows so many misinterpretations and omissions that it is difficult to see which authors, if any, have been consulted.

And when finally we call attention to some of the most elementary terms as "aqueous" defined as "nearly colorless, see hyaline," and "Eu" used as abbreviation and indicating, "when used after a species, that this is, certainly, a well-defined species, not a variety"! (while as used by Gray it indicates that the species occurs in Europe also,) we have probably given sufficient data to enable the reader to estimate the value of this book as "a guide to teachers and students"!

Considering this publication as it stands, it is hardly to be believed that the botanists, whose names appear in the preface, could really have given any critical thought either to the manuscript or to the proof of this book; if so explanations are in order.

There is, on the other hand, a work to which the author does not refer, although many of the definitions show an unmistakable resemblance to the corresponding ones in it. The Century Dictionary seems to have been used very freely, and it is, there-

fore, very natural that mistakes and misinterpretations should occur frequently. The botanical part of the Century Dictionary is largely a compilation of words and definitions without due criticism.

In reference to the reviews of this book which have appeared in the Botanical Gazette and in the Bulletin of the Torrey Botanical Club, one of two conclusions appears inevitable. Either the writers are themselves ignorant of modern botany, or they have followed the common and reprehensible practice of reviewing a book without having read it. The latter is the probable and more charitable conclusion.

In contrast to these complimentary reviews of the book in question, we can only say it would have been much more beneficial to the study of botany in this country if the book had never been printed.

THEO. HOLM.

PROCEEDINGS OF SOCIETIES.

CALIFORNIA ACADEMY OF SCIENCES. *May 1, 1893.* President Harkness in the chair.

Donations to the museum were reported from S. J. Holmes and W. L. Watts.

The Librarian reported 236 additions to the library.

Dr. George H. Horn, the well-known entomologist, was introduced by the President.

Walter E. Bryant read a paper on the "Variations of the Bill of the California Jay."

William L. Watts read a paper entitled "Notes on Quicksilver Deposits in California."

June 5, 1893. President Harkness in the chair.

Donations to the museum were reported from W. W. Price, Mrs. R. M. Austin, W. L. Watts, Gustav Eisen, Mrs. Geo. Buttner, Mrs. C. A. Boland, Charles Fuchs, Frank E. Harris, F. W. Gill.

The Librarian reported 352 additions to the library.

Dr. Gustav Eisen read a paper on "Recent Investigations on the Pollination of the Fig."

Walter E. Bryant read a paper on "Some Cases of Albinoism in California Mammals," with exhibition of specimens.

CALIFORNIA BOTANICAL CLUB. *May 8, 1893.* Miss Eastwood in the chair.

The following were elected to membership: Dr. C. F. Clark, Miss Anna T. O'Brien, Miss Alice Derrick, Dr. Mary G. Campbell, Miss Isabella D. Clark, Mrs. Jennie C. Kahler, Mrs. Ida M. Blochman, Miss G. M. Potter, Charles P. Grimwood, Mrs. C. E. Quigley.

May 25, 1893. President Dudley in the chair.

Prof. W. R. Dudley spoke on his investigations of the polarity of the leaves of certain species of Wyethia and desired notes on the subject from observers.

June 5, 1893. Dr. Gustav Eisen in the chair.

Mrs. Clara Ferrer and Prof. F. H. Hillman were elected to membership.

NOTES AND NEWS.

The zoologically little known northern portion of the peninsula of Baja California has been visited this year by two parties, both bringing back good collections of mammals, birds and reptiles. Messrs. Anthony and Thurber paid attention principally to birds and mammals, securing some new forms of the latter. Mr. Anthony's previous visit in 1889, supplementing the researches of Mr. Belding, leaves but little to be hoped for in the way of new forms of birds. The objective place of both expeditions was the high mountain San Pedro Martir. Messrs. Stowell and Lunt, of Leland Stanford Jr. University, spent nearly two months in the same region this summer and obtained a good general collection, especially of the reptiles, and have made some valuable observations on the mammals and birds, especially on the status of *Tamias obscurus*. Both parties are to be congratulated on their successful work, and the results when published will add greatly to our knowledge of the peninsula

fauna, where it blends to some extent with that of Alta California.

A new illustrated monthly journal, devoted to the nests and eggs of birds, is soon to appear under the editorship of Mr. H. R. Taylor, of Alameda, who is already known to oologists through these columns.

Mr. Charles A. Keeler has returned from a voyage around Cape Horn to New York, much improved in health from a cruise of over four months.

Mr. J. W. Blankinship has returned from a six weeks' collecting trip in Northern California, with a large collection of plants, many of them rare in herbaria. Among them may be mentioned *Delphinium uliginosum*, *Astragalus Rattani*, *Howellia limosa*, *Phacelia Rattani*, *Mimulus nudatus*, *Eriogonum tripodum* *Brodiaea stellaris*, *Brodiaea rosea*, *Fritillaria pluriflora*, *Damasonium Californicum*.

The Herbarium of the California Academy of Sciences, by far the most important west of the Mississippi, is rapidly increasing in size. During the present year it has already been augmented by about 20,000 sheets. Besides the continual additions made by its curators in California, it has lately received by the generous kindness of the Gray Herbarium, the private collection of Dr. George Thurber; from Professor C. S. Sargent, of the Arnold Arboretum, a complete and carefully classified set of the trees and shrubs of that fine botanic garden. From Miss Eastwood it has received the plants collected by her during the whole of the last summer in Colorado and Utah; from W. H. Shockley, all the duplicates of his herbarium; from T. S. Brandegee, all the duplicates of his collections in California and Baja California; and from corresponding botanists, smaller collections too numerous for mention. These, in addition to the usual purchases, make a very large total for the first half of the current year. The permanent mounting of the plants on sheets of white paper is in steady progress. The mounting paper of the herbarium is of somewhat different dimensions from the ordinary standard in America, the sheets being 11x17 inches.

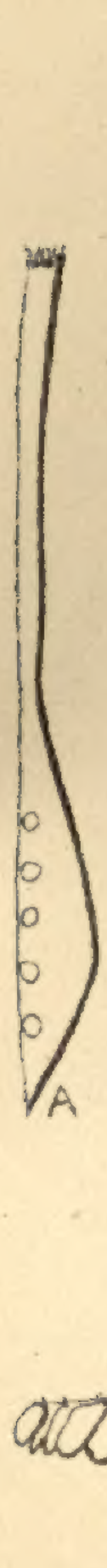
Professor Daniel C. Eaton, Yale University, New Haven, Conn., desires specimens of Sphagnum, or Bog Mosses, from California. They have been found in swamps near Mendocino City; at the head of Williams Lake, near Lassen Peak; in wet meadows, Mariposa Grove; in bogs near Kings River; Mt. Dana, Mt. Brewer, Upper Tuolumne Cañon, Yosemite Valley in the spray of Vernal Falls. The following instructions for collecting and preserving should be noted. They may be expected anywhere in cold bogs:

"All the plants for one series of sixty specimens should be gathered at one time and place, to avoid the chance of mixing two different forms under one number. The plants of dense habit of growth should be separated into broad, thin specimens while fresh, cleaned of foreign matter, and preserved in botanizing portfolios in the usual manner, *taking care not to subject them to any severe compression. Just enough pressure to keep them flat is enough.* Floating plants, such as the plumose forms of *S. cuspidatum*, are best prepared by spreading the specimens on letter-paper, as is usual in preserving the more delicate seaweeds. If the collector has no means of pressing the specimens, they may be gathered in bulk, and, when air-dried, sent in packages to Professor Eaton, who can have them softened and spread out for drying at some convenient time. Care should be taken to note the place and time of each collecting, and the approximate height of the station above sea-level."

Professor C. H. Gilbert and Professor O. P. Jenkins, of the Stanford University, have joined Dr. Barton W. Evermann, of the U. S. Fish Commission, in an expedition to examine the headwaters of the Columbia in regard to the fish fauna, the obstructions to the ascent of salmon, and the location of a salmon hatchery.

Professor W. E. Ritter, of the State University, has spent a part of his vacation in making, with the assistance of several of his students, a biological reconnoisance of Santa Catalina Island.

Professor C. H. Tyler-Townsend, of the Agricultural College, Las Cruces, New Mexico, has taken the position of Curator of the Scientific Institute at Kingston, Jamaica.



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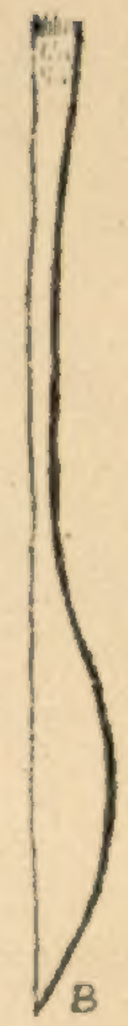

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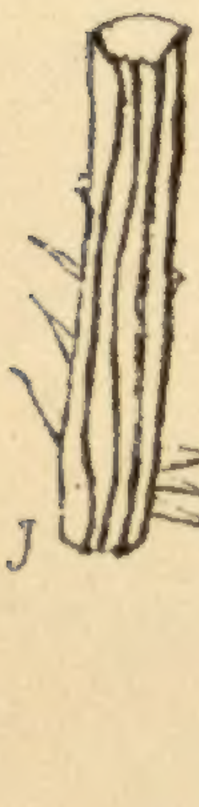

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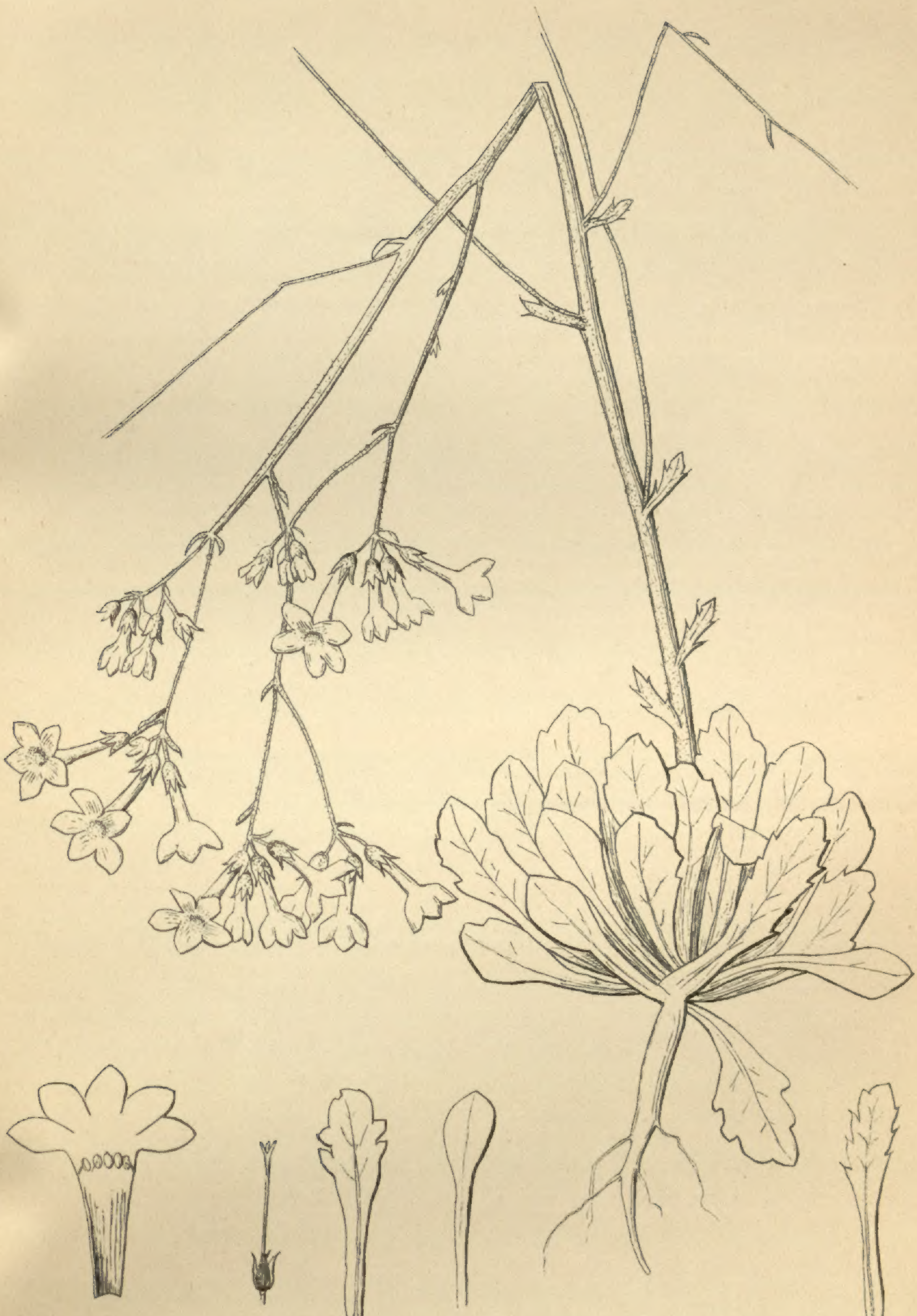

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